Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052
Telephone: (425) 883 0777
Fax: (425) 882 5498

SUPPORT PLANS FOR THE ENGINEERING EVALUATION/COST ANALYSIS WORK PLAN FOR THE AVERY LANDING SITE AVERY, IDAHO

Submitted to:

Potlatch Land and Lumber, LLC

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052

June 23, 2009

073-93312-02.002

887069

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200
Redmond, WA USA 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498
www.golder.com

ATTACHMENT A

TREATABILITY STUDY WORKPLAN FOR THE AVERY LANDING SITE AVERY, IDAHO

Submitted to:

Mr. Terry Cundy
Potlatch Land and Lumber, LLC

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052

Douglas J. Morell, Ph.D., L.HG.
Principal

Lee K. Holder, P.E.
Associate Engineer

June 23, 2009

073-93312-02.002

Distribution:

1 Copy	Stoel Rives, LLP, Kevin Beaton
4 Copies	EPA, Earl Liverman

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This document is the Treatability Study Workplan for the Avery Landing Site (the Site), prepared by Golder Associates Inc. (Golder) on behalf of Potlatch Land and Lumber LLC (Potlatch).

1.1 Background

The Site is located along State Highway 50 about 0.75 mile west of the town of Avery, Idaho (Figures 1 and 2). The Site was originally developed as a railroad roundhouse, maintenance, repair, and fueling depot. There is little remaining at the Site to indicate its previous use. Presently the Site is relatively flat ground with gravel and sparse vegetative growth. The ground is composed mainly of fill, presumably to create a larger flat area for the railroad operations.

Potlatch entered into Administrative Order on Consent (AOC) No 10-2008-0135 with the U.S. Environmental Protection Agency (EPA) to complete an Engineering Evaluation / Cost Analysis (EE/CA) for the Site. In support of the EE/CA, a treatability study will be performed to provide data on potential treatment options.

The following COPCs have been identified for Site soils:

- Diesel and heavy oil
- Naphthalenes
- PAHs (including carcinogenic PAHs)

Potential treatment technologies include:

- In-situ biological treatment
- In-situ chemical treatment
- Soil washing
- Land treatment (landfarming)
- Thermal desorption.

1.2 Purpose and Scope

The purpose of this workplan is to define and describe the work to be performed to complete the treatability study for the Site in support of the EE/CA.

In-situ biological and chemical treatment technologies will be considered in the EE/CA using a literature review and desktop evaluation. Because of the amount of LNAPL present, it is expected that no proven in-situ treatment technology (other than LNAPL removal) will be practical. Therefore, in-situ treatment is not included in this treatability study. Water Treatment and LNAPL removal technologies will be evaluated in the EE/CA.

The scope of this treatability study will focus on size separation and soil washing. This treatment approach is believed to have the highest potential for practical application to the Site. Petroleum compounds typically concentrate in the finer soil fractions (smaller particle sizes). In addition, larger size particles (e.g., gravel and coarse sand) are typically easier to clean by soil washing than smaller

size particles because the larger-size particles have less sorption capacity and are usually simply coated on the surface. However, the extent to which these factors apply can vary considerably in different soils.

By separating clean and contaminated size fractions, size separation reduces the quantity of material requiring disposal or further treatment. Soil washing removes contaminants from soil, thereby eliminating or reducing the quantity of material requiring disposal or further treatment. Even when soil washing does not achieve cleanup levels, the contaminant reduction can reduce the difficulty and cost of further treatment. Thus, soil washing can function as stand-alone treatment, or as pretreatment in conjunction with another technology (e.g., land treatment or thermal desorption).

The objective of the soil washing treatability study will be to determine the residual TPH concentrations in various size fractions after size separation and soil washing. These results will indicate which size fractions require no further treatment after soil washing, and which need either further treatment or disposal. The percentages of the various size fractions will be determined during the study.

The analytical results from the various soil fractions and residuals resulting from soil washing will be compared to the following criteria, guidelines, and cleanup standards in the Treatability Study Report: EPA Removal Action Level Guidelines and Regional Screening Levels; Idaho Risk Evaluation Manual concentrations for soil and groundwater; federal drinking water standards; Idaho water quality standards; NOAA Screening Quick Reference Tables, Freshwater Sediment Criteria; and the Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, as applicable.

Those fractions and residuals not meeting cleanup goals will be evaluated for further treatment. First, the estimated costs of off-site landfill disposal, on-site thermal desorption, and on-site land treatment will be compared (assuming for the moment that both treatment technologies would be sufficiently effective). If this cost comparison indicates that on-site treatment warrants further consideration, then the soil fractions and residuals from soil washing that do not meet cleanup goals will be combined into a sample for further treatment testing. In this case, this treatability study work plan will be amended to define the additional treatment studies to be performed for land treatment and/or thermal desorption.

If land treatment is to be considered (based on the cost comparison), then a treatability test would be required to determine effectiveness. However, the specifics of such testing would vary with the nature of the materials to be treated, and is therefore not specified at this time.

Thermal desorption is generally effective on petroleum compounds. Based on analysis of samples obtained during this treatability study (TPH, TOC, moisture, particle size), an approximate cost estimate can be prepared for thermal treatment in the EE/CA. Because of this, it is not expected to be necessary to perform bench- or pilot-scale testing for evaluating alternatives. However, if it appears that thermal treatment will be included in the preferred remediation alternative, then additional treatability testing may be performed to demonstrate effectiveness and better define treatment costs before completing the evaluation of alternatives.

2.0 SOIL WASHING STUDY PLAN

Size separation and soil washing are addressed in an integrated manner in the study plan described in this section. It is anticipated that the bench-scale testing described herein will be performed by ART Engineering (Tampa, Florida) under the oversight of Golder. Laboratory analyses will be performed by Pace Analytical (Seattle, Washington) or other qualified laboratory.

2.1 Sample Collection

Bulk samples of the soils in the "smear zone" impacted by LNAPL (from approximately 12 to 14 feet below ground surface) will be obtained from 6 locations at the Site, as shown on Figure 2. The test pits will be located in areas where LNAPL has been found in wells during previous investigations. The test pits are spread throughout the eastern half of the Site in order to obtain aerial coverage across the portion of the Site where known LNAPL is present. If, after a test pit is excavated, no LNAPL smear zone is observed, the location of that test pit will be moved over several feet in an attempt to find a smear zone for sample collection. These samples will be obtained from test pits using an excavator. The bulk soil samples will only contain soil from the LNAPL smear zone (i.e. "clean" soil will not be collected for the bulk soil samples). The soil from the test pits will be placed on plastic sheets and mixed using the excavator bucket and/or shovels. Photographic documentation will be made of field conditions and the test pits during sampling.

Two 5-gallon buckets of soil from each test pit (total 60 gallons) will be shipped to ART Engineering in Tampa, Florida. Samples from each test pit will also be collected laboratory provided containers and submitted to Pace Analytical for laboratory analysis. These samples will be composited and labeled as discussed in Section 2.2. One 55-gallon drum of soil from each test pit will be retained on-Site for possible future use.

2.2 Sample Compositing

ART Engineering will prepare three composite samples from the 60 gallons of soil collected for the bench testing. Composite #1 will be from test pits TS-1 and TS-2, Composite #2 from TS-3 and TS-5, and Composite #3 from TS-4 and TS-6 (see Figure 2). These samples will represent the range of concentrations in soil that might be treated. Performing three washing tests (one for each composite) will provide an indication of variability in both the soils and also the washing process. Bench-Scale Testing. Figure 3 shows a flow diagram of the soil washing treatability study. This approach is designed to simulate the steps in the soil washing process. Each of the composite samples will be processed separately as indicated in this figure.

2.2.1 Soil Screening at 1/2" and Coarse Gravel Washing

Each of the three composite samples will be dry-screened at ½". The coarse gravel fraction will be washed using water at room temperature. The washed gravel will be Sample "A".

2.2.2 Soil Washing

The soil fraction less than ½" (Sample "B") will be passed dry through a 10-mesh screen to produce Sample "C". This same soil fraction (Sample "B") will also be processed through wet screening at 10 mesh and hydraulic separation at approximately 200 mesh to simulate the full scale soil washing process. The fines fraction and wash water will be flocculated and dewatered into the simulated filter cake. The following products will be generated by this hydraulic separation:

- Washed gravel 10 mesh to ½" (Sample "D")
- Dewatered fines fraction (Sample "E")
- Sand after hydraulic separation (Sample "F")
- Wash water from the hydraulic separation and dewatering (Sample "WW").

Three washing tests (Samples "WS-1", "WS-2", and "WS-3) will be performed on the sand after hydraulic separation. The objective of the additional washing tests will be to determine the lowest possible hydrocarbon level in the sand through use of surfactants and/or elevated temperatures. These tests will be performed sequentially, and subsequent tests (with more aggressive/expensive treatment) may not be performed if sufficient cleanup is achieved in earlier test.

2.3 Laboratory Analyses

Table 1 shows the plan for chemical analysis. Refer to Figure 3 for sample designations.

Composite samples #1, #2, and #3 that are submitted directly to Pace Analytical represent the concentrations of COCs in the smear zone before treatment. These samples will be analyzed for COCs, particle size distribution, and moisture content. These results will be used to compare to the treated sample results.

Laboratory analyses cannot be performed directly on gravel-size particles. Therefore, gravel samples "A" and "B will be crushed to 95% passing a 10 mesh screen before sending to the laboratory for chemical analysis along with the other samples. Sample "C" is soil passing a 10 mesh screen, and therefore does not require crushing.

In addition, a particle size distribution analysis using wet screening will be performed by ART Engineering on Sample "B" (the soil fraction less than ½"). The results will be mathematically corrected for amount of coarse gravel greater than 1/2" that was removed by the initial screening.

It is difficult to obtain meaningful direct analytical results (mg/kg) on soils with large particle sizes. Sample photographs before and after washing will document the effectiveness of washing the Site gravel, as well as written documentation summarizing visual observation of the wash results. In addition, the Synthetic Precipitation Leaching Procedure (SPLP, EPA Method 1312) will be run on the washed gravel samples and analyzed for TPH.

3.0 SCHEDULE AND REPORTING

It is expected that this workplan will be approved no later than mid-May 2009. If this is the case, then sample collection for this treatability study can start performed in the late spring or early summer of 2009.

The soil washing study is expected to take approximately four weeks (excluding analytical time) from the time samples are obtained, plus an additional three weeks for laboratory analysis. The Treatability Study Report will be prepared within approximately one month of receipt of the analytical results.

A report will be prepared on completion of the testing, documenting the study methodology and analytical results. The analytical results will be presented in a narrative discussion and compared against the EPA Removal Action Guidelines and Regional Screening Levels; Idaho Risk Evaluation Manual concentrations for soil and groundwater; federal drinking water standards; Idaho water quality standards; NOAA Screening Quick Reference Tables, Freshwater Sediment Criteria; and the Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems, as applicable.

TABLE

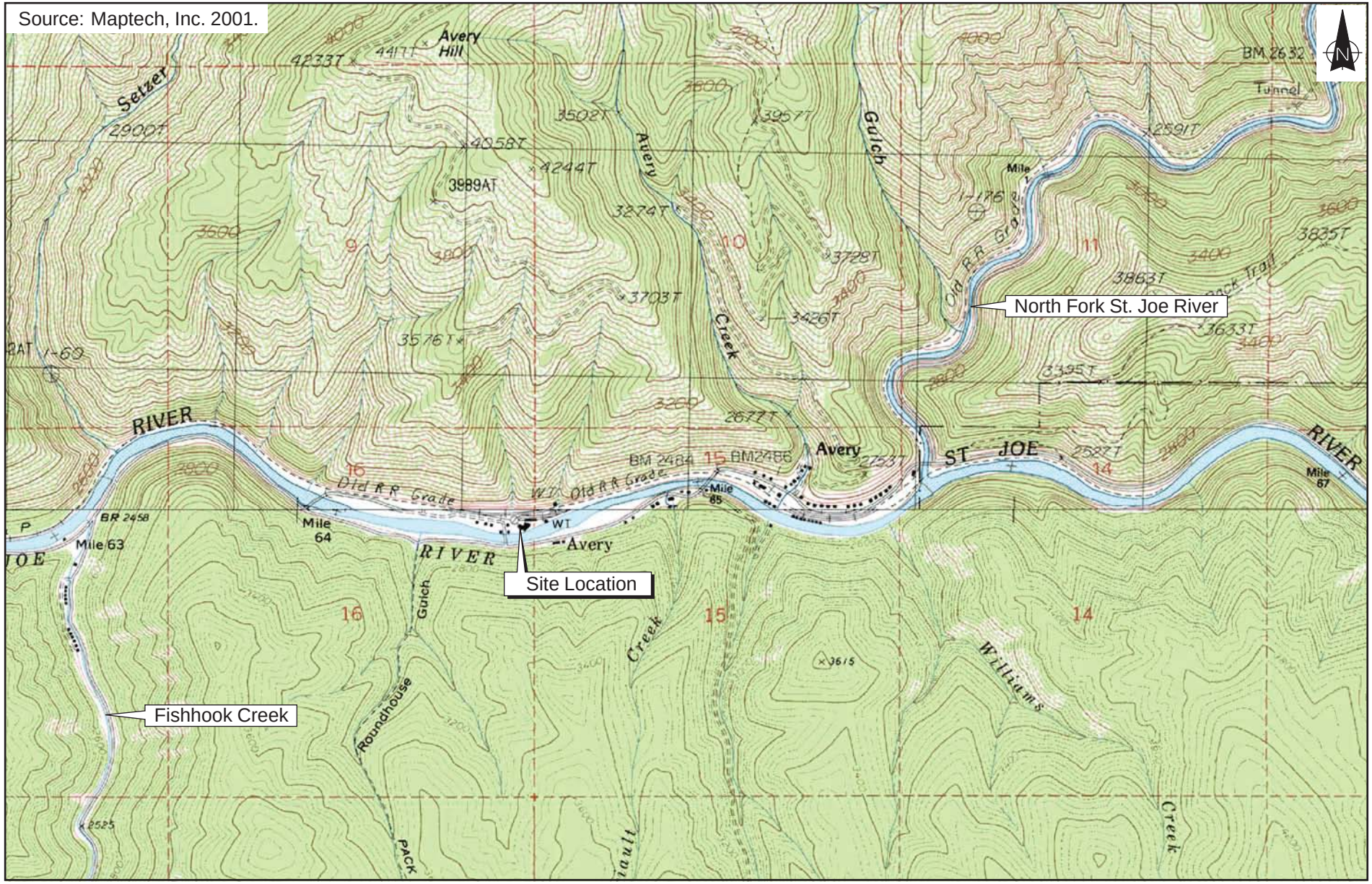
Treatability Study Analytical Plan
Avery Landing Site

Sample	Sample ID	Particle Size Analysis	Moisture (% by weight)	TPH-diesel extended	Soil TOC	TPH-diesel on SPLP leachate	PAHs by GC/MS	PCBs	TAL Metals	TCL VOCs	TCL SVOCs
Composites #1, #2, and #3		X	X	X			X	X	X	X	X
Washed gravel	Sample "A"	X	X			X	X	Note 2			
Soil fraction minus 1/2" (crushed)	Sample "B"	X	X	X	Note 3		X	X			
Soil fraction minus 10 mesh (crushed)	Sample "C"	X	X	X	Note 3			Note 2			
Washed fine gravel (+10 mesh - 1/2", crushed)	Sample "D"	X	X	X	Note 3			Note 2			
Fines filter cake	Sample "E"	X	X	X	Note 3		X	Note 2			
Sand after hydraulic separation	Sample "F"	X	X	X	Note 3		X	Note 2			
Wash water from hydraulic separation	Sample "WW"			X			X	Note 2	X	X	X
Washed sand - Test 1	Sample "WS-1"	X	X	X	Note 3		X (see Note 4)	Notes 2 & 4			
Washed sand - Test 2	Sample "WS-2"	X	X	X	Note 3						
Washed sand - Test 3	Sample "WS-3"	X	X	X	Note 3						

Notes:

1. Refer to Soil Washing Treatability Study Flow Diagram for sample designations.
2. PCB analysis if and only if PCBs concentration exceeds cleanup level in Sample B.
3. Samples not meeting cleanup goals based on TPH-diesel will be analyzed for Soil TOC.
4. One washed sand sample will be selected for PAH and PCB analysis based on TPH results.

FIGURES



Source: Ecology and Environment, Inc., 2007

FIGURE **1**

SITE VICINITY MAP

TREATABILITY STUDY WORK PLAN AVERY LANDING SITE/WA

LEGEND

- Property Line & Section 16-15 Division Line
- Site Boundary
- EPA Monitoring Well
- EPA Soil Boring
- Monitoring Well
- Domestic Well
- Surface Water Sample Location
- Proposed EE/CA Monitoring Well
- Proposed River Sediment and Floating LNAPL and Surface Water Sampling Location
- Proposed Test Pits for Soil Sampling
- Proposed Borehole for Soil Sampling
- Proposed Angled Borehole for Soil Sampling
- Treatability Study Test Pits

0 140

APPROXIMATE SCALE IN FEET

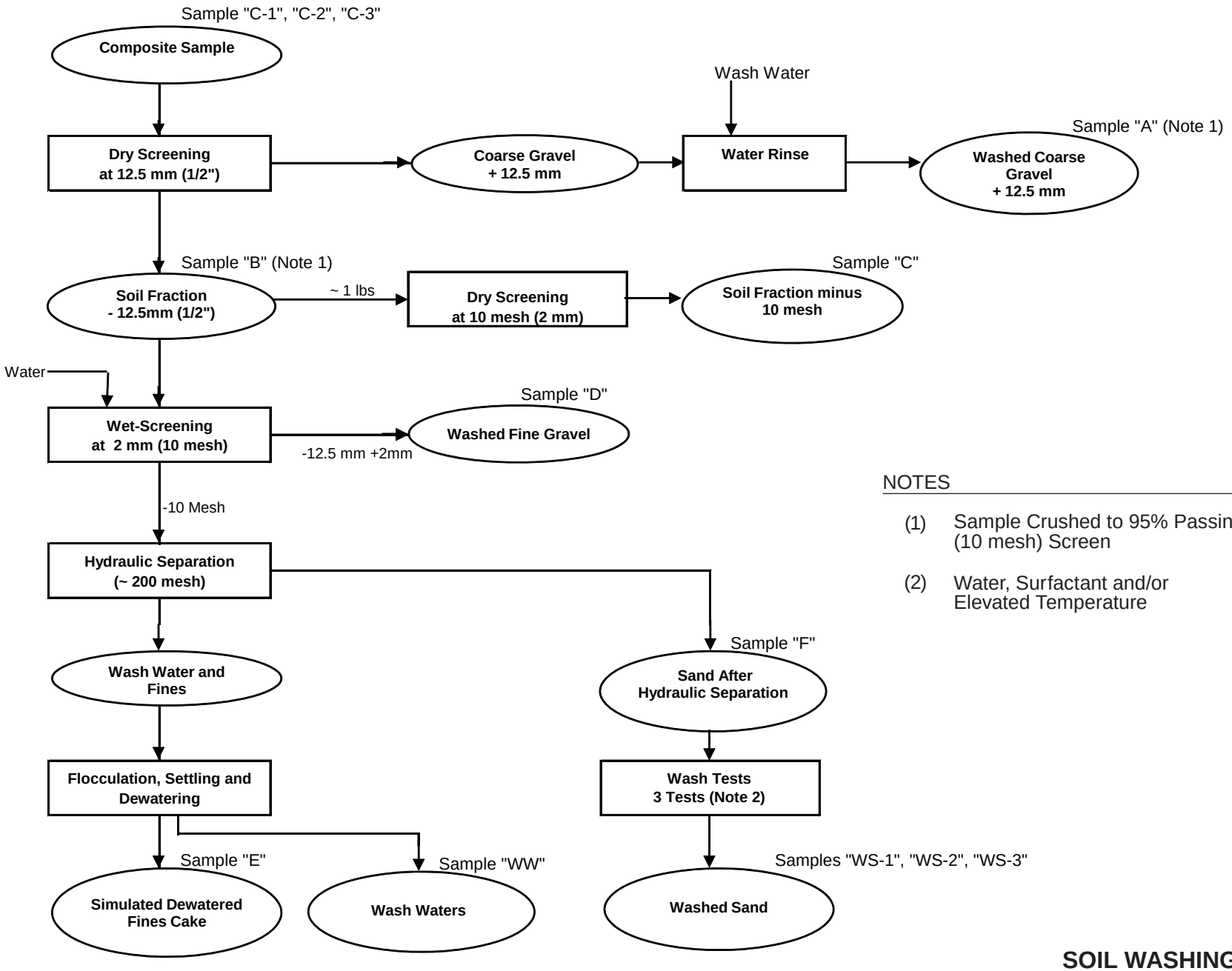
FIGURE **2**

TREATABILITY STUDY SAMPLING LOCATIONS

WORK PLAN AVERY LANDING SITE/WA

0739331202002fig02_R1.ai | Mod: 06/23/09 | AMP

Golder Associates



NOTES

(1) Sample Crushed to 95% Passing 2 mm (10 mesh) Screen

(2) Water, Surfactant and/or Elevated Temperature

Modification of Figure Provided by ART Engineering, LLC

FIGURE **3**
SOIL WASHING TREATABILITY STUDY FLOW DIAGRAM
POTLATCH/AVERY LANDINGEE/CAPLANS/ID

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200
Redmond, WA USA 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498
www.golder.com

ATTACHMENT B

FIELD SAMPLING AND ANALYSIS PLAN FOR THE ENGINEERING EVALUATION/COST ANALYSIS WORK PLAN AVERY LANDING SITE AVERY, IDAHO

Submitted to:

Mr. Terry Cundy
Potlatch Land and Lumber, LLC

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052

Douglas J. Morell, Ph.D., L.HG.
Principal

Kirsi S. Longley
Project Environmental Scientist

June 23, 2009

073-93312-02.002

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AOC	Administrative Order on Consent
bgs	below grade surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
COPCs	contaminants of potential concern
DI	Deionized
EPA	U.S. Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
Golder	Golder Associates Inc.
HASP	Health and Safety Plan
HSA	hollow-stem auger
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDW	investigative derived waste
IDWR	Idaho Department of Water Resources
LNAPL	light, non-aqueous phase liquids
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
Milwaukee Railroad	Chicago, Milwaukee, St. Paul and Pacific Railroad Company
µg/L	microgram per liter
NTU	nephelometric turbidity units
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons-Diesel extended
PAHs	polynucleated aromatic hydrocarbons
Potlatch	Potlatch Forest Corporation and Potlatch Corporation
PCBs	polychlorinated biphenyls
PQL	Practical Quantification Limit
QA	quality assurance
QP	quality procedures
QAPP	Quality Assurance Project Plan
RAO	removal action objectives
ROW	right-of-way
SAP	Field Sampling Analysis Plan
SDS	Sample Data Sheets
SVOC	semi-volatile organic compound
Site	Avery Landing Site, Avery Idaho
TP	technical procedures
VOC	volatile organic compounds
Work Plan	Engineering Evaluation/Cost Analysis Work Plan for the Avery Site

1.0 INTRODUCTION

Potlatch Land and Lumber, LLC (Potlatch) has entered into an Administrative Order on Consent (AOC) No 10-2008-0135 with the U.S. Environmental Protection Agency (EPA) to complete an engineering evaluation/cost analysis (EE/CA) for the Avery Landing Site (Site). The EE/CA will provide sufficient information on the source, nature, and extent of contamination, any human health and ecological risks presented by the Site, and recommended removal action alternatives appropriate for addressing the removal action objectives. This document is the Field Sampling and Analysis Plan (SAP) for conducting the EE/CA at the Site and is Attachment B of the EE/CA Work Plan. The SAP is supported by the Quality Assurance Project Plan (QAPP), provided as Appendix A to this report. The SAP describes or references the field procedures that will be used for the collection of data. Field procedures that are routinely used by Golder Associates Inc. (Golder) are standardized as Technical Procedures (TP) or Quality Procedures (QP) and will be provided if requested.

The statement of purpose and EE/CA objectives are outlined in Section 1 of the EE/CA Work Plan. The Site historical and background information are summarized in Section 2 and the physical setting in Section 3 of that document. This SAP provides guidance for the field tasks that will support the EE/CA scope of work presented in Section 5 of the Work Plan. The activities addressed in the scope of work in the Work Plan have been organized into field tasks to be conducted under this SAP.

The overall approach for the EE/CA is to assess the nature and extent of the contamination at the Site and to evaluate a limited number of removal action alternatives appropriate for addressing the contamination that has impacted soil, groundwater, and surface water. The EE/CA removal action evaluation will support the recommendation of a Non-Time Critical Removal Action that meets Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements. The EE/CA focuses on the protection of human health and the environment considering the direct exposure to shallow soils, protection of groundwater supplies, and protection of the St. Joe River.

1.1 Site Location

The Site is located along State Highway 50 about 0.75 miles west of the town of Avery, Idaho (Figure SAP-1). The Site boundary is shown on Figure SAP-2 and extends along the St. Joe River about 0.5 miles. The Site property is within the NW quarter of Section 15, Township 45North, Range 5 East and the NE quarter section of Section 16, Township 45 North, Range 5 East, Willamette Meridian. The approximate latitude is 47° 13’ 57’’ North and longitude is 11° 43’ 40’’ West.

Presently, there are four properties located on the Site: Highway 50 Property (owned by the Federal Highway Administration and the U.S. Forest Service); the Bentcik property; the Potlatch property; and the State of Idaho property (stream bed and banks of the St. Joe River as well as the Site groundwater). Several residents live on-Site year-round, and several more reside on the property seasonally. A domestic groundwater supply well is in the western portion of the Potlatch property for use by the residents and visitors. The eastern portion of the Potlatch property is vacant with numerous monitoring wells and piezometers that are used for monitoring groundwater. Access to the Site is unrestricted. The immediate area around the Site is residential and recreational. The St. Joe River is adjacent to the Site.

1.2 Background

The Site was used as a Chicago Milwaukee St. Paul Railroad (herein referred to as a Milwaukee Railroad) maintenance and fueling station from 1907 to 1977. In 1980, Potlatch acquired ownership of a portion of the Site and utilized it as a log landing and log storage area through the 1980s.

Portions of the property were leased to third parties for a variety of uses such as log storage, material storage, parking, cabin sites and trailer sites (a number of which are still in effect). Historically, the Milwaukee Railroad had stored and handled petroleum products and hazardous substances on the Site.

As indicated in Section 2 of the Work Plan, investigations have been conducted onsite since the late 1980s. Removal actions have included impacted soil excavation, floating product capture trenches, and the installation of an impermeable vertical wall along the St. Joe River. In 1994, three separate floating product capture trenches were installed to intercept groundwater having floating petroleum products called Light Non-Aqueous Phase Liquids (LNAPLs). LNAPL was removed from the trenches using skimming-type pumps. The system operated from 1994 to 2000 and recovered approximately 1,290 gallons of oil. Golder understands that portions of the trenches became dry and failed to capture all floating LNAPLs, as witnessed by continued floating LNAPL discharges along river bank seeps. In 2000, an impermeable vertical wall was installed along the St. Joe River to prevent floating LNAPL from migrating to the river. The LNAPL was to be removed from capture wells located up-gradient of the barrier. This removal system appears to have worked for a number of years until seeps containing LNAPL oil were observed during river low flows in the fall of 2005. As a result, oil absorbent booms were placed in the river around the seeps. This SAP only addresses work to be completed under the tasks identified in the EE/CA Work Plan.

2.0 FIELD INVESTIGATION APPROACH AND TASK ASSIGNMENTS

2.1 Approach

The Site encompasses about 10 acres. The uses of the site include Highway 50 right-of-way, stream banks of the St. Joe River, and residences. A domestic water supply well is also on the property. All adjacent and surrounding properties are considered off-site areas in this SAP. A map of the location of the Site is illustrated in Figure SAP-1. Figure SAP-2 is a detailed project layout map of the Site.

In Section 4 of the Work Plan, information on the Site conditions and conceptual model is provided. The major issues and approach for the EE/CA are also presented Section 4 of the Work Plan. The SAP tasks that will generate data have been identified for the Site and are outlined below:

- **Phase I – Subsurface Soil Investigation** (TBD)
- Task 1: Additional Soil Sampling
- Task 2: Treatability Study Soil Sampling
- **Phase II – Groundwater Investigation** (TBD)
- Task 1: Additional Monitoring Well Installation
- Task 2: Groundwater Sampling
- Task 3: Groundwater hydraulic Gradient Investigation
- Task 4: Groundwater Pump Test
- **Phase II – Near Shore Investigation** (TBD)
- Task 1: Near Shore Floating LNAPL Sampling
- Task 2: Near Shore Surface Water Sampling
- Task 3: Near Shore Sediment Sampling
- **EE/CA Evaluation & Reporting** (Project Team)

To the extent practicable, Treatability Study soil sampling will take place during SAP soil sampling activities.

2.2 Task Assignments

The lead field personnel responsible for each task are identified in the above list of field tasks. Section 3 of this SAP describes each EE/CA field investigation task, identifies the media and sampling locations, provides the field procedures and defines the physical and chemical analyses that will be performed during this EE/CA. Each field leader will be responsible for the work being conducted in accordance with the Treatability Study Work Plan (Attachment A of the EE/CA Work Plan), this SAP (Attachment B of the EE/CA Work Plan), the QAPP (Appendix A of this SAP), the HASP (Attachment C of the EE/CA Work Plan), the Biological Assessment Work Plan (Attachment B of the EE/CA Work Plan), and the Cultural Resource Work Plan (Attachment E of the EE/CA Work Plan).

3.0 FIELD INVESTIGATION TASKS

This section describes the EE/CA field investigation tasks that will be conducted. The media and sampling locations are identified along with the procedures and nomenclature that will be used for sample acquisition and documentation. The QAPP (Appendix B of the SAP) and Golder Technical Procedures or the referenced sampling procedures shall be used in conjunction with this SAP for implementation of the EE/CA field tasks. Before any intrusive work is conducted within the Site boundary, the Site owners will be notified of the work schedule at least one week prior to mobilization. The location of the intrusive boring and the access route to each sampling location for drilling/sampling equipment must also be approved by Potlatch prior to mobilization.

3.1 Phase I – Subsurface Soil Investigation

3.1.1 Task 1 – Soil Sampling

In addition to prior sampling done in the area of the boiler room and machine shop, Golder will collect subsurface soil samples from the western portion of the Site (west of current residential buildings) and from the area in the vicinity of the former 500,000 gallon fuel oil tank. Bulk soil samples from the "smear zone" within the known LNAPL Plume area will be obtained for testing in the Treatability Study (Attachment A of the EE/CA Work Plan). The soil sample data will provide information on potential releases of petroleum products and hazardous materials on the western portion of the Site and to determine the northern and eastern extent of the contamination in the vicinity of the old fuel oil tank that is believed to be the source of released oil.

Seven test pits will be excavated at locations shown on Figure SAP-3 in the western portion of the Site. Three of the test pits (TP-5, TP-6, and TP-7) will be located along former railroad spurs while the remaining four test pits (TP-1 through TP-4) will be located randomly through the rest of the western half of the Site in order to achieve representative aerial coverage of the Site. The test pit soil samples will be obtained using an excavator until groundwater is observed, which is expected to occur at a depth of approximately 10 to 12 feet below ground surface (bgs). If the excavator is not able to reach groundwater (at approximately 10 to 12 feet bgs) because the substrate encountered is too rocky, a hollow-stem auger (HSA) drill rig will be used to collect the soil samples. The type of drill rig that is used will also be limited by what is available through local drilling companies.

Five boreholes will be drilled using a HSA in order to collect soil samples in the vicinity of the former fuel oil tank located adjacent north of Highway 50, as shown on Figure SAP-3. These samples are to investigate a portion of the Site that is a potential source location that has not been previously investigated. Boreholes will be used to obtain soil samples in the vicinity of Highway 50, because boreholes will pose less risk to the integrity of the highway and boreholes provide the ability to obtain samples beneath the highway without having to close a portion of the road to traffic. Two of the HSA boreholes (BA-2 and BA-3) will be drilled at an angle to be able to inspect soils beneath Highway 50. The remaining three HAS boreholes (BA-1, BA-4, and BA-5) will be drilled vertically. During drilling, soil samples will be obtained at five-foot intervals and at the interface of the water table.

Six additional test pits will be excavated in the vicinity of the former railroad facility on the eastern part of the Site as part of the Treatability Study. The approximate locations of the Treatability Study test pits are depicted on figure SAP-3 and are labeled TS-1 through TS-6. The test pits will be located in areas where LNAPL has been found in wells during previous investigations. The test pits are spread throughout the eastern half of the Site in order to obtain aerial coverage across the portion of the Site where known LNAPL is present. The purpose of the Treatability Study test pits is to

obtain bulk samples of soil from the LNAPL smear zones in order to identify the effectiveness of washing Site soils that are impacted by LNAPL. The bulk soil samples will only contain soil from the LNAPL smear zone (i.e. "clean" soil will not be collected for the bulk soil samples). If, after a test pit is excavated, no LNAPL smear zone is observed, the location of that test pit will be moved over several feet in an attempt to find a smear zone for sample collection. The soil samples will be placed in 55-gallon drums for shipment to the selected laboratory. The Treatability Study sampling activities are discussed further in the Treatability Study Work Plan located in Appendix A of the EE/CA Work Plan.

The test pit and drilling activities will be subject to protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures will be provided upon request.

- TP 1.2-5 "Drilling, Sampling, and Logging Soils"
- TP 1.2-18 "Sampling Surface Soil for Chemical Analysis"
- TP 1.2-6 "Field Identification of Soil"
- TP 1.2-23 "Chain of Custody"

The Golder sample forms to be completed with these technical procedures are contained within the technical procedures.

3.1.1.1 Preparation activities

Preparation activities for this task include the following:

- Preparing bid package and contracting for certified excavation and drilling contractors
- Coordination with the chemical analytical laboratory
- Mobilizing necessary field equipment and supplies
- Obtain necessary drilling permits and START Cards from Idaho Department of Water Resources (IDWR)for drilling boreholes to obtain soil samples
- Obtain necessary County and/or Federal permits for drilling within and/or adjacent to the Highway 50 right-of-way
- Obtain access permission for the Benticik property
- Underground utility locating through public utility locate request and contracting with a private locator

Before all intrusive subsurface investigation activities, the Potlatch Site Manager shall be notified and a utility locate request will be filed with local utility organizations. All utilities located by the Utility Locating Services will be confirmed as clear before beginning subsurface excavation and drilling activities.

3.1.1.2 Soil Sampling

Excavation and drilling will be done on the Site by an Idaho licensed contractor and under the continuous supervision of a Golder field representative. Proposed test pit and soil borehole locations are presented in Figure SAP-3 and have been established in areas where investigative data is absent. At each test pit or borehole, soil samples will be collected from the surface, middle, and bottom

depths. If soils are discolored, stained and appear impacted, a soil sample will be obtained representing the potentially impacted horizon as a substitute for the middle depth soil sample. If multiple horizons of impacted soil are observed, each horizon will be sampled in addition to the surface and bottom depths of the test pit or borehole. During drilling, soil samples will be obtained using a 2.5-inch or larger diameter drive tube fitted with a lined split-spoon sampler at every five-foot interval (starting at the surface) and at the interface of the water table. Soil samples will be logged and described in the field using the USCS classification and a Munsell soil color chart. Borehole soil will be transferred into new clean plastic wide mouth bottles, labeled, and archived for potential future analytical testing.

3.1.1.3 Selection of Soil Samples for Chemical Analyses

The test pit spoils and drilling drive samples will be inspected for indication of the presence of petroleum hydrocarbons based on field screening methods (i.e., visual signs, sheen testing, olfactory senses, and PID measurements). Soil samples will be placed in glass sample bottles that are appropriate for chemical analyses.

The laboratory analytical methods that Test America Analytical Services are to use are as follows:

- Northwest Total Petroleum Hydrocarbons for diesel and extended range organics (NWTPH-Dx)
- EPA Method 8270C for polynucleated aromatic hydrocarbon compounds (PAHs), including naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene
- EPA Method 8082 for polychlorinated biphenyls (PCBs) on surface samples at each sampling location

Additionally, soil samples collected from the seven test pits from the western portion of the Site will also be analyzed for the following analytical methods:

- EPA Method 8260B for Target Compound List (TCL) volatile organic compounds (VOCs)
- EPA Method 8270C for TCL semi-volatile organic compounds (SVOCs)
- EPA Methods 6010C/6020A and 7471B for TAL metals
- All soil samples from the test pits will be analyzed for PCBs using EPA Method 8082

All obtained soil samples will be sent to Test America Analytical Services laboratory in Spokane, Washington.

3.1.1.4 Sample Nomenclature and Documentation

Documentation for sampling will include bottle labels, completion of Sample Integrity Data Sheets and Chain of Custody Records. Sample coolers will be secured with chain of custody seals. Each soil sample will have a unique identification number including Golder (G), the test pit number (i.e., TP2 for test pit # 2), the depth of the sample, and the sample collection date. An example of a soil test pit sample from soil test pit #2 that would be taken from the 10 foot depth on January 13, 2009 would be G-TP2-10-011309. Soil samples obtained from HSA drilled boreholes will be identified by the borehole number (ex. BH2 instead of TP2) and depth from surface for each soil sample.

3.1.1.5 Test Pit and borehole Backfilling

All test pits will be backfilled by a licensed excavation contractor with the soil that was removed from the test pit and marked with flush-mount steel plate (~1 to 2-inch diameter) identification markers flush with the ground surface. Boreholes will be backfilled with bentonite or bentonitic grout from the bottom of the borehole to land surface and marked with a flush-mount steel plate identification markers. These steel plate markers will be provided by the certified surveyor and labeled with the test pit identification number. Using this method, the test pit locations may be located in the future using GPS combined with metal detection methods.

3.1.1.6 Surveying and Geodetic Control

The position of all test pits and boreholes is to be field-located and marked by Golder personnel in a manner that does not interfere with Site operations. Each test pit location will be marked with a flush-mounted steel plate marker that will be surveyed for horizontal coordinates (X and Y) using a differential Global Positioning System (GPS) by Golder field personnel. Additionally, boreholes BH-1 through BH-5 will be surveyed by a certified surveyor using appropriate survey coordinate system at the same time as the monitoring wells (installed as part of Phase II of this investigation) will be surveyed. The test pits will not be surveyed by a surveyor.

3.2 Phase II – Groundwater Investigation

The hydrogeologic study will focus on the groundwater quality directly beneath the Site, and in particular the western portion of the Site where investigation data is absent. A number of monitoring wells installed by EPA and Potlatch currently exist on the eastern portion of the Site. Because no monitoring wells currently exist on the western portion of the Site, a total of four monitoring wells (designated GA-1 through GA-4) will be installed along the western half of the Site. Figure SAP-3 shows the proposed locations of new monitoring wells to be installed and sampled during the field investigation. Well GA-1 will be located between the St. Joe River and the existing monitoring well HC-1R, as shown on Figure SAP-3. Two wells (GA-2 and GA-3) will be located near the river within the western portion of Section 16 Area of the site where investigative data is absent. The fourth well (GA-4) will be installed hydraulically up-gradient (northeast) of the drinking water supply well (DW-01) for monitoring groundwater approaching the supply well (see Figure SAP-3). These additional monitoring wells together with well HC-1R will provide protective monitoring for Site COPCs in the groundwater migrating toward the residential groundwater supply well. The proposed location for GA-1 also provides information of the down-gradient extent of the floating LNAPL on the groundwater table. GA-2 and GA-3 monitoring wells will provide information on potential releases in the western portion of the Site. The monitoring wells will be drilled using HSA drilling techniques. HSA drilling will be conducted because historical HSA drilling activities at the Site were successful. Other drilling methods will likely hit refusal when encountering large cobbles or boulders, but the HSA drilling method is capable of handling some rocky lithology. If refusal occurs during drill, the drill rig will be moved by a few feet and the borehole will be re-drilled. The monitoring wells will be installed with screens traversing the anticipated water table fluctuations. After monitoring well installations are complete, the wells will be surveyed for geodetic x, y, z coordinates and water-level elevations measured to determine groundwater elevations. The new groundwater monitoring wells will also provide a determination of the local groundwater flow and gradient.

The groundwater within the western portion of the site is derived from either direct infiltration of meteoric precipitation, from groundwater flowing from the east, or from groundwater flowing from the north. This additional groundwater investigation will help identify flow patterns in the western portion of the Site. Prior to initiating the installation of the new groundwater wells, the groundwater levels and LNAPL thickness must be determined for each existing wells and piezometers, in an effort to identify whether there have been any changes in the LNAPL plume since the last investigation was conducted. If changes in the plume are observed, EPA will be notified and the locations of the proposed soil borings and monitoring wells will be re-evaluated.

This task includes the anticipated sampling and analysis of groundwater by installing new monitoring wells and sampling existing monitoring wells located around the Site to collect additional groundwater quality data. Golder proposes to collect groundwater samples from the eight existing drinking water and groundwater monitoring wells.

The groundwater samples will be obtained during two sampling events. Analyses will be for standard field parameters and constituents of potential concern (COPC) at the Site.

3.2.1 Task 1 - Monitoring Well Drilling and Installation

Four groundwater monitoring wells will be drilled and installed on the western portion of the Site using HSA drilling methods. The monitoring wells will be located at the approximate locations shown on Figure SAP-3. The drilling installation and development of the monitoring wells will be subject to controls and strict quality assurance (QA) protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures will be provided if requested.

- TP 1.2-5 “Drilling, Sampling, and Logging Soils”
- TP 1.2-12 “Monitoring Well Drilling and Installation”
- TP 1.2-6 “Field Identification of Soil”
- TP 1.2-23 “Chain of Custody”

The Golder forms to be completed with these technical procedures are contained in the technical procedures.

3.2.1.1 Preparation Activities

Preparation activities for this task include the following:

- Preparing bid package and contracting for certified drilling contractors
- Coordination with the chemical analytical laboratory
- Mobilizing necessary field equipment and supplies
- Obtain necessary drilling permits and START Cards from IDWR
- Underground utility locating through public utility locate request

Before all intrusive subsurface investigation activities, the Potlatch Site Manager shall be notified of the drilling schedule and locations of the anticipated boreholes and a utility locate request will be filed with local utility organizations. All utilities located by the Utility Locating Services will be confirmed as clear before beginning subsurface drilling activities. If additional lines or obstructions

are found during this task, subsurface boring locations will be adjusted appropriately to avoid encountering any and all underground utilities.

3.2.1.2 Borehole Drilling and Soil Sample Collection

Monitoring wells will be drilled and installed by a State of Idaho licensed driller using an HSA drill rig. All drilling will be under continuous supervision of a Golder geologist/engineer.

Before arriving at the Site and before drilling each borehole (to prevent cross chemical contamination), the down hole equipment will be steam-cleaned using approved tap water source until no visible dirt remains. The monitoring wells will be installed in order of cleanest to the most likely impacted. Likely, this will mean that GA-3 will be the first drilled and installed well and GA-1 will be the last. The HSA borings will be advanced using nominal 6-inch ID rotary casing advanced continuously. Drilling will stop after penetrating 10 feet into the aquifer water table.

Soil cuttings will be collected for geologic logging at 5-foot intervals throughout the entire borehole and at the interface with the water table and logged by a Golder geologist/engineer in the field using Unified Soil Classification System (USCS) soil descriptions. Samples will only be collected and analyzed if field observations (i.e., visual signs, olfactory senses, and PID measurements) indicate impacted material. If impact is observed, the soil cutting samples will be transferred into glass sample bottles that are appropriate for chemical analyses of the contaminants of potential concern (COPCs) as specified in the QAPP (see Appendix A).

3.2.1.3 Chemical Analysis of Monitor Well Boring Soil Samples

Soil samples collected from the well borings to be analyzed will be sent to Test America Analytical Services laboratory in Spokane, Washington for analysis of the following constituents in accordance with QAPP (Appendix A) requirements:

- EPA Method 8260B for TCL VOCs
- EPA Method 8270C for TCL SVOCs
- EPA Methods 6010C/6020A and 7471B for TAL Metals
- Diesel and Heavy Oil Range Total Petroleum Hydrocarbons (NWTHP-Dx)
- EPA Method 8082 for PCBs

3.2.1.4 Sample Nomenclature

Documentation for sampling will include bottle labels, completion of Sample Integrity Data Sheets and Chain of Custody Records. Sample coolers will be secured with chain of custody seals. Each soil boring sample will have a unique identification number including Golder (G), the boring number (i.e., GA2 for monitoring well GA-2), the depth of the sample, and the sample collection date. An example of a soil boring sample from monitoring well GA-2 that would be taken from the 10 foot depth on January 13, 2009 would be G-GA2-10-011309.

3.2.1.5 Well Installation

All well installations will be under continuous supervision of a Golder geologist/engineer. The monitoring well borings will be advanced to a depth of approximately 10 feet below the top of the static groundwater table. Upon completing each of the borings to the desired depth, a monitoring

well will be installed and registered in conformance with IDWR well construction regulations (IDAPA 37.03.09) and follow Golder Technical Procedure TP-1.2-12 "Monitoring Well Drilling and Installation". A schematic installation diagram for the monitoring wells is shown in Figure SAP-4.

All wells will be completed with 2-inch diameter stainless-steel, wire-wrapped well screen and schedule-40 PVC casing with O-rings seal between joints. The well screens will be 15 feet in length and fabricated with 0.020-inch slots, or other appropriate slot size based on encountered formation materials. Shorter screen intervals may be used where appropriate based on lithologies encountered. The monitoring well screens will traverse the anticipated water table fluctuations. To accommodate these fluctuations, the screens will be installed to straddle the water table surface with 5 feet above and 10 feet below the static water level at the time of installation. The casing shall be centered in the hole and a bottom cap shall be attached to the end of the well casing.

Well installation will be conducted inside the drill borehole stabilization casing and the well installation will meet EPA and IDWR requirements. A filter pack shall extend from about 6 inches below the well screen to no more than approximately 3 feet above the topmost slot on the well screen. The filter pack materials shall consist of clean, chemically inert, well sorted silica sand and shall be sized for the formation and the screen slot size. The annulus between the PVC well casing and the wall of the drill casing may be used for the placement of the sand filter during well construction. The drill casing will not be pulled above the depth of the materials placed. As it is being placed, the top of the filter pack will be measured with a weighted engineering tape. The sand pack will be surged with a surge block (as part of well development to settle the sand before placing the bentonite seal).

After sand pack surging, 5 feet of bentonite pellets or chips will be placed in an unhydrated state immediately on top of the filter pack and subsequently hydrated. At least one hour will be allowed for the bentonite seal to hydrate before the remaining seal is placed. The remainder of the annular space shall be sealed using cement grout with 5 percent bentonite. The cement grout will be placed by injection from the bottom of the open annular space through a tremie pipe. Quick setting cement grout shall not be used as a borehole seal without the approval of the project manager. The top 4 to 5 feet will be filled with concrete as a base for the protective monument.

3.2.1.6 Well Monument Construction

All monitoring wells will be completed with a nominal 8-inch diameter protective steel well monument with a lockable lid. The monument will be flush mounted with the ground surface. At least a 6-inch clearance shall be maintained between the well cap and the monument lid to allow placement of a data logger, if needed.

The protective monument will be painted yellow and given the well designation. The well tag will be attached to the inside of the well monument lid. A 0.25-inch weep hole will be drilled at the base of the monument and the monument's annulus filled with drainage sand or pea gravel. The wells will be capped using a plastic slip cap.

3.2.1.7 Well Development

Following installation of the groundwater monitoring wells, and after adequate time has elapsed for the grout to harden (minimum 24 hours), the monitoring wells shall be developed. Well development is performed to produce representative formation water that is free of drilling fluids, cutting, or other materials potentially introduced during drilling and well construction. Development shall be performed through a combination of surging (via a surge block) and groundwater purging (via bailer or submersible pump). Representative water is assumed to have been obtained when pH,

temperature, specific conductance and turbidity readings have stabilized (pH within 0.1 standard pH units, temperature within 0.5 degrees C, conductivity within 10 percent and turbidity within 0.5 nephelometric turbidity units (NTU) and below 2 NTU).

Groundwater produced during purging shall be captured in 55-gallon drums or suitable tank(s) and labeled as "investigative derived wastes" (IDW). Characterization of the water for disposal will be based on results of groundwater sample analysis. Additional IDW sampling may be required before disposal at a licensed Site. Golder will work with Potlatch to manage IDW and may be able to dispose of it during the remedial action, with IDEQ and EPA approval.

3.2.1.8 Well Drop Tube Installation

For wells where LNAPL is suspected to be present, a polyvinyl chloride (PVC, schedule 10) drop tube will be installed in each well. The drop tube will be installed after the thickness of the LNAPL has been estimated. The drop tube will aid in groundwater sampling by protecting the sample collection tubing from LNAPL contamination. The PVC drop tube will be long enough to advance 1 foot below the water level (i.e. 1 foot below the bottom of the LNAPL layer). The bottom of the drop tube is sealed with a piece of tinfoil fixed to the tube by a hose clamp. A ½-inch stainless steel ball will be placed inside of the drop tube so that it rests on the tinfoil. Deionized (DI) water is slowly added to the drop tube until it has filled drop tube up to 1.25 feet from the bottom. The stainless steel ball and the water will cause the tinfoil to create a meniscus. The drop tube is then lowered into the well until the bottom of the drop tube is 1 foot below the water level. The tinfoil meniscus will prevent any LNAPL from entering the drop tube and will prevent LNAPL from adhering to the outside of the tinfoil. If the tinfoil was placed on the drop tube without the ball or DI water, there is the risk that the water pressure will dimple the tinfoil allowing LNAPL to pool inside of the dimple.

The drop tube will be held in place by a PVC plate (with a hole at its center) that is glued to the outside of the drop tube. The plate will then rest on the top of the well casing thereby suspending the drop tube inside the casing. The drop tube will remain in the well from one to three weeks until the water column has stabilized. A drop tube will be dedicated to each well that has floating LNAPL thereby reducing the risk of cross-contamination.

Before collecting a groundwater sample, the DI water must be removed from the drop tube using a peristaltic pump and ¼-inch HDPE tubing (to eliminate mixing of the DI water and groundwater). Once the DI water has been removed, the tinfoil will then be punctured with a stainless steel rod, causing the stainless steel ball to drop to the bottom of the well. A new piece of ¼-inch HDPE tubing with its end capped will be lowered inside of the drop tube to 1-foot below the bottom of the drop tube (approximately two feet below the water level). The cap will further prevent LNAPL from coming in contact with the sample tubing intake. Connect the ¼-inch tubing to a peristaltic pump and run the pump in reverse flow so that the air pressure blows the cap off of the tubing. Low-flow sampling can commence once the cap is off the tubing.

The drop tube will remain in place until the end of the second groundwater sampling event, after which the drop tube will be removed. After removal of the drop tube (and after several hours of equilibration) the thickness of LNAPL will be estimated for a second time in each well.

3.2.1.9 Monitoring Well Geodetic Survey

Following completion of the installation of monitoring wells, the wells will be geodetically surveyed. All new wells and existing monitoring wells that are used in the investigation will be surveyed by a certified surveyor using appropriate survey coordinate system. Surveying the wells will be conducted

by a certified professional land surveyor licensed in the State of Idaho. Each monitoring well will be surveyed for geodetic X, Y and Z coordinates. Monitoring wells will have elevation (Z-coordinate) surveyed for:

- Ground surface elevation
- Top of monument elevation
- Top of PVC drop tube plate or PVC casing (if no drop tube is installed) at measuring point elevation
- Surface location in units of northings and eastings

All elevations on the wells will be surveyed to third order accuracy and precision. Elevation surveys will have an accuracy and precision of at least 0.02 foot for water elevation measurement. Surveys will reference the site-specific coordinate system used for previous investigations.

3.2.2 Task 2 - Groundwater Sampling

After development activities are completed and the aquifer has had at least one week to stabilize, groundwater samples will be collected. Two groundwater sampling events are proposed for EE/CA investigation to confirm analytical results. Groundwater samples will be collected from all the new groundwater monitoring wells (GA-1 through GA-4) and from existing wells DW-01, HC-1R, EMW-04, MW-11, EW-3, EMW-06, EW-4, and MW-5 (depicted on Figure SAP-3). The selected monitoring wells provide aerial coverage of the groundwater impacts on-Site.

Groundwater quality sampling activities will be conducted in accordance with protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures include the following, and will be provided if requested.

- TP-1.4-6a “Manual Water Level Measurements”
- TP-1.2-20 “Collection of Groundwater Quality Samples”
- TP-1.2-23, “Sample Handling, and Chain of Custody”

The Golder sample forms to be completed with these technical procedures are contained in the technical procedures.

Preparation activities for this task include:

- Requesting necessary field groundwater sampling equipment and supplies
- Obtaining 55-gallon drums (or appropriate) for the collection of purge water
- Locating appropriate decontamination area at the Site

3.2.2.1 Groundwater Sampling Activities

Sample collection and handling will be performed appropriately in accordance with the QAPP. All instruments used for field analysis will be calibrated in accordance with manufacturer’s recommendations. Chain of custody will be maintained appropriately by the field crew members.

Groundwater sampling activities from the monitoring wells will include the following activities:

- Inspection of each well for the presence of floating LNAPL, including all new and existing wells and piezometers
- Estimate the thickness of floating LNAPL, if present
- Measurement of static water levels in all new and existing wells and piezometers
- Collection of floating LNAPL samples from MW-11 and HC-4
- Groundwater samples will be obtained using Low-Flow groundwater sampling techniques
- Measurement of field parameters (pH, specific conductance, temperature, dissolved oxygen, and turbidity) during purging with field sampling equipment
- Sampling of groundwater when the field parameters indicate that the well has been adequately purged
- Collection of representative groundwater samples in appropriate containers for COPCs
- Collection of a filtered groundwater sample for dissolved metals analysis
- Preservation and proper storage of each sample
- Collection of all purge water in appropriate containers for temporary on-site storage before disposal

Each well will be inspected for the presence of floating LNAPL using a product detecting meter. The static water level will be measured at all monitoring wells before initiating any groundwater purging activities. Monitoring wells with floating LNAPL will need to be sampled through a drop tube discussed in Section 3.2.1.8. All wells (with or without LNAPL) will be sampled using a peristaltic pump and HDPE ¼-inch tubing with a cap on one end. The cap will further prevent floating LNAPL or LNAPL sheen from contacting the sample tubing intake through carry-down. Connect the ¼-inch tubing to a peristaltic pump and run the pump in reverse flow so that the air pressure blows the cap off of the tubing. Low-flow sampling can commence once the cap is off the tubing. It is not anticipated that a large LNAPL thickness will be encountered that hinders groundwater sample collection using a peristaltic pump, but in the event this occurs, a bailer will be used.

The groundwater monitoring wells will be purged at a low-flow rate for sample acquisition, such that water table drawdown is less than 0.3 feet. Dedicated tubing will be used for each well. Intakes for the pump or sampling tube will be set at the center of the water column in the screened intervals, or two feet below the water level.

During well purging, field parameters pH, conductivity, turbidity, dissolved oxygen, and temperature will be measured every 5 minutes. The instruments used in the field parameter measurements will be field calibrated per the manufacturers' specifications and as described in the QAPP at the beginning of the day. Purging will be conducted until the measured rate of change of these parameters is in accordance with TP-1.2-20 on consecutive readings. Turbidity must be less than 5 NTU for the sample to be considered representative of groundwater conditions. All field parameter measurements and purge volumes will be recorded on Sample Integrity Data Sheets.

A filtered groundwater sample will also be collected from each well after the collection of unfiltered groundwater samples. The filtered sample will be collected using an inline 0.45 micron filter. The filtered sample will be sent to the laboratory, but will be archived until unfiltered sample results are reviewed by Golder.

3.2.2.2 Floating LNAPL Sampling Activities

Floating LNAPL samples will be collected from MW-11 and HC-4 because these wells were found in the past to have a significant thickness of floating LNAPL. The floating LNAPL sample should be collected from the well after collecting a groundwater sample; however, no groundwater sampling will be conducted in HC-4. A new piece of HDPE ¼-inch tubing should be used to collect the LNAPL sample. The sample will be collected in appropriate sample containers and analyzed for all groundwater COPCs. Other wells with floating LNAPL will not be sampled because the amount of LNAPL available is not enough for sample collection. If, however, other wells are found to have a significant thickness of floating LNAPL (greater than 0.5 inches), EPA will be notified and the LNAPL in that well will be collected for analysis.

3.2.2.3 Sample Nomenclature

Documentation for sampling will include bottle labels, completion of Sample Integrity Data Sheets and Chain of Custody Records. Sample coolers will be secured with chain of custody seals. The Sample Integrity Data Sheet will be used to document sample collection information, as further described in the QAPP. A unique identification number shall be given to each groundwater sample that includes Golder (G), the well number (i.e., GA2 for monitoring well GA-2), and the sample collection date. An example of a groundwater sample from monitoring well GA-2 collected on January 13, 2009 would be G-GA2-011309. A floating LNAPL sample will additionally have the letters FP (Floating Product) behind the monitoring well number (i.e. G-MW11FP-011309).

3.2.2.4 Chemical Analysis of Groundwater Quality and LNAPL Samples

Groundwater and LNAPL samples will be analyzed at Test America Analytical Services laboratory in Spokane, Washington for the following components:

- Diesel and Heavy Oil Range Total Petroleum Hydrocarbons (NWTHP-Dx)
- PAHs – EPA Method 8270C
- Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene – EPA Method 8270C
- PCBs (only from GA-1, GA-2, GA-3, and GA-4 wells and LNAPL samples) – EPA Method 8082
- TAL Metals – EPA Method 6010C/0620A Series and EPA Method 7470A on the unfiltered groundwater samples. The filtered groundwater samples will be sent to the laboratory and archived for potential analysis based on the results of the unfiltered samples.

3.2.3 Task 3 - Groundwater Hydraulic Gradient Investigation

To better understand the flow of groundwater at the Site, all new and existing monitoring wells will be monitored for groundwater level (elevation) changes. Using an oil/water interface probe, the water level and the LNAPL level (if present) will be measured in each well. The thickness of the LNAPL can also be measured using a bailer. Monitoring wells with floating LNAPL will have the water level corrected for the thickness of the LNAPL present. The correction factor includes multiplying the LNAPL thickness in the well by the specific gravity of the LNAPL, then adding this amount to the elevation of the water level in well (EPA, 1995). The St. Joe River is expected to influence the flow of Site groundwater based on antecedent infiltration and river stage. Elevation survey data for each existing monitoring well will be obtained from the EPA. The additional monitoring wells installed by Golder will be surveyed to the same datum as the other Site wells. The water levels in all of the wells

will be monitored monthly, depending on weather conditions for access, beginning prior to the initiation of the soil and groundwater investigations.

Water level monitoring will be compared to changes in the St. Joe River to better understand the influence various river stages have on Site groundwater flow patterns. A temporary staging station will be installed near the Site on the St. Joe River for measurements of river water levels. The upstream bridge at Avery, Idaho may be used to establish a temporary river stage station if one does not exist in the area. The water level data collected from the monitoring wells and the St. Joe River will be used to understand changes in groundwater flow patters during different seasons and during changes in the stage of the river.

Groundwater hydraulic gradient investigations will be conducted in accordance with protocols and procedures specified in the relevant Golder Technical Procedures. The technical procedure for this task includes TP-1.4-6A "Manual Water Level Measurements". The technical procedures will be provided if requested. The Golder sample forms to be completed with these technical procedures are contained in the technical procedures.

Groundwater hydraulic gradient investigation includes the following activities on a monthly basis:

- Requesting necessary field equipment and supplies prior to event
- Obtaining permission from adjacent property owners to collect groundwater levels from existing wells (if required) prior to event
- Inspection of each well for the presence of floating LNAPL
- Estimate the thickness of floating LNAPL, if present
- Measurement of static water levels in monitoring wells
- Measurement of river water level from either the upstream bridge at Avery, Idaho or a temporary staging station

Water levels in monitoring wells should be measured from the cleanest wells first and the wells with floating LNAPL last. Decontamination of the water level meter should be conducted between each well.

3.2.4 Task 4 - Groundwater Hydraulic Tests

Short-term hydraulic slug tests will be performed on four selected monitoring wells (from the list of existing and new wells). The selection of wells for slug-testing will be based on well installation documentation, field inspections, and aerial representativeness. The need and implementability for a long-term pump test will be evaluated based on the results of the short-term slug-test.

If it is deemed necessary (based upon observed conditions in the monitoring wells), we may conduct a single well drawdown and recovery test. Water level fluctuations will be recorded using a down hole pressure transducer equipped with a data acquisition system.

The slug test investigation will be conducted in accordance with protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures include the following, and will be provided upon request:

- TP-1.2-17 Rising Head Slug Test
- TP-1.4-11 Single Borehole Drawdown and Recovery Pump Test

The Golder sample forms to be completed with these technical procedures are contained in the technical procedures.

Preparation activities for this task include:

- Reviewing existing monitoring well data
- Requesting necessary field groundwater sampling equipment and supplies
- Obtaining 55-gallon drums (or appropriate) for the collection of purge water
- Locating appropriate decontamination area at the Site

3.3 Phase III – Near Shore Investigation

The St. Joe River LNAPL seep, surface water, and sediments will be sampled along the river embankment to assess discharges and impacts from the Site. The river stations are shown on Figure SAP-3. There are a total of eight near shore sampling locations labeled RS-1 through RS-8. RS-1 will represent up-river background for comparison to the remainder sampling locations. Only one sediment sampling event will take place. There will be two LNAPL and surface water sampling events that will coincide when LNAPL is visibly discharging along the river's edge during low river flows (typically summer and fall seasons). All of the river stations need to be marked by survey stakes (or similar) so that the river stations can be easily located over the course of sampling events. The near shore investigation will be conducted by two field personnel for safety reasons due to the proximity to water. At no time will the field personnel enter the water to collect near shore samples.

3.3.1.1 Near Shore Sediment Sampling Activities

The near shore sediment investigation will be conducted in accordance with protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures include the following, and will be provided upon request:

- TP-1.2-24 Sediment Sampling
- TP-1.2-23, Sample Handling, and Chain of Custody

The Golder sample forms to be completed with these technical procedures are contained in the technical procedures.

Preparation activities for this task include:

- Coordination with the chemical analytical laboratory
- Mobilizing necessary field equipment and supplies

Two sediment samples will be collected from each river station. One sample will be collected at the shoreline (Right below the water line) and the second one will be collected approximately three to four feet from the shoreline (in the water). The banks of the St. Joe River are rip-rap lined, so the shoreline sediment sample will be collected as close to the waterline as practical, wherever the sediment has been deposited. The shoreline samples will be collected from the surface of the

sediment (upper 3-4 inches) using a pole-mounted drive tube with a sand catching assembly. A stainless steel spoon or trowel will be used to transfer the sediment into the laboratory provided container. All sampling equipment will be decontaminated between each sample. Each sediment core sample will be visually inspected for its petroleum content to identify if any smearing of petroleum has occurred during fluctuations of river levels. Any differences in petroleum content between the surface and the bottom of the core sample will be noted. The entire sediment core sample will be transferred directly into a laboratory provided container for chemical analysis.

The second sample (three to four linear feet from the shoreline) will also be collected from the surface of the sediment (upper 3-4 inches) using a pole-mounted drive tube with a sand catching assembly. The sampler will stand on the rip-rap along the river's edge and will use the pole-mounted drive tube to reach the sediment located three to four linear feet from the shoreline. At the time of the sediment sampling, it is not anticipated that the river depth will be very deep. The drive tube with a pole (or extended handle) will be driven through the water into the sediment so that the upper 3-4 inches of surface sediment can be sampled. The drive tube assembly will prevent the sediment from being washed away as it is pulled up through the water column. The sediment will either be directly placed in the laboratory provided container from the drive tube or a stainless steel spoon will be used to transfer the sediment from the drive tube into the sample jars. All sampling equipment will be decontaminated between each sample. An alternative sampling method to the drive tube would be a hand auger with an extended handle.

3.3.1.2 Near Shore LNAPL and Surface Water Sampling Activities

The near shore LNAPL and surface water investigation will be conducted in accordance with protocols and procedures specified in the relevant Golder Technical Procedures referenced below. These technical procedures include the following, and will be provided upon request:

- TP-1.2-26 Surface Water Sampling Methods
- TP-1.2-23 Sample Handling, and Chain of Custody

A Golder Technical Procedure does not exist for LNAPL sample collection. The Golder sample forms to be completed with these technical procedures and sampling efforts are contained in the technical procedures.

Preparation activities for this task include:

- Coordination with the chemical analytical laboratory;
- Mobilizing necessary field equipment and supplies.

Two LNAPL and surface water sampling events will occur. Each event will occur when LNAPL is visibly discharging along the river's edge during low river flows (typically summer and fall seasons). LNAPL will be collected from the surface water sampling stations along the river bank, if any LNAPL is present. Golder will obtain a sample of LNAPL that accumulates behind the oil floatation booms adjacent to a river sampling station by carefully skimming the LNAPL directly into laboratory provided clean sample vials. The laboratory will be instructed to use only the LNAPL for sample analysis.

Surface water samples will be collected from the eight river stations depicted in Figure SAP-3 (the same locations where the sediment samples were collected). Surface water samples will be obtained below the river water surface from about the mid-depth. Since the surface water samples are to be

obtained adjacent to the river's edge (~ 1 foot from the shore), the depth of the river is expected to be very shallow. Therefore, depth discreet surface water samples will not be necessary. Unfiltered surface water grab samples will be collected directly from the river if there is no visible floating LNAPL present at a specific sampling station either by filling laboratory provided sample containers directly (if there is not an acid preservative in the sample container) or by using a laboratory cleaned glass cup, the contents of which would then be transferred into the laboratory provided containers. Sampling surface water below a floating LNAPL will be conducted by lowering a dedicated HDPE ¼-inch tubing to a peristaltic pump with a plastic cap below the LNAPL layer. The cap will be blown off the sampling tube by reversing the air flow with the pump. The sample will then be obtained by pumping surface water with the peristaltic pump directly into the sampling containers with appropriate preservatives.

Filtered surface water samples will also be collected at each river station by using dedicated HDPE ¼-inch tubing, a dedicated inline 0.45-micron filter, and a peristaltic pump by filtering water pumped directly out of the surface water body into laboratory provided containers with appropriate preservatives. Filtered surface water samples will be collected so that the results can be compared to aquatic water quality standards. The filtered surface water samples will be analyzed for hardness-dependent metals (see Section 3.3.1.4 for details), but the remaining filtered surface water sample will archived in case further analysis is warranted based on the analytical results of the unfiltered surface water samples.

Water quality parameters (temperature, pH, conductivity, dissolved oxygen, and turbidity) will also be monitored at each river station where a sample is collected. The water quality parameters will be recorded on a Sample Integrity Data Sheet.

3.3.1.3 Sample Nomenclature

Documentation for sampling will include bottle labels, completion of Sample Integrity Data Sheets and Chain of Custody Records. Sample coolers will be secured with chain of custody seals. The Sample Integrity Data Sheet will be used to document sample collection information, as further described in the QAPP. A unique identification number shall be given to each sediment, LNAPL, and surface water sample that includes Golder (G), the river station number (i.e., RS2 for river station number RS-2), the type of sample it is (SED for sediment, FP for LNAPL/floating product, and SW for surface water), sediment sample location from the shoreline (for sediment samples only- 0 for shoreline samples and 3 for samples collected 3 feet from the shoreline), and the sample collection date.

An example of a sediment sample from river station RS-2 collected at 3 feet from the shoreline on January 13, 2009 would be G-RS2SED-3-011309. A floating LNAPL sample will additionally have the letters FP (Floating Product) behind the monitoring well number (i.e. G-MW11FP-011309). A surface water sample collected from river station RS-2 collected on January 13, 2009 would be G-RS2SF-011309.

3.3.1.4 Chemical Analysis of Sediment, Surface Water and LNAPL Samples

Sediment, LNAPL, and surface water will be analyzed at Test America Analytical Services laboratory in Spokane, Washington for the following components:

- Diesel and Heavy Oil Range Total Petroleum Hydrocarbons (NWTHP-Dx)
- PAHs – EPA Method 8270C
- Naphthalene, 1-Methylnaphthalene, and 2-Methylnapthalene – EPA Method 8270C
- PCBs – EPA Method 8082
- TAL Metals– EPA Method 6010C/6020A and 7470A/7471B; unfiltered surface water samples will be analyzed for TAL metal and the filtered surface water samples will be archived in case additional analysis is warranted based on unfiltered water sample results
- TCL VOCs (sediment only) – EPA Method 8260B
- TCL SVOCs (sediment only) – EPA Method 8270C

4.0 FIELD INVESTIGATION SUPPORTING PROCEDURES

The preceding section identified those tasks that will be completed to fulfill the requirements of the EE/CA. The following section provides the procedures required to support the EE/CA tasks.

4.1 Field Health and Safety

A Site specific Health and Safety Plan for EE/CA investigations are provided in Attachment C to the Avery Landing EE/CA Work Plan. Key elements of on-Site safety will be communicated to the field personnel, including personal protective measures and equipment, emergency preparedness, and incident protocol. Due to the remoteness of the Site, the Health and Safety Officer will also ensure adequate communication equipment is available to field personnel for contact in the case of field emergencies. The Health and Safety Plan will be reviewed by all field personnel and a tailgate health and safety meeting will be conducted at the beginning of each day. The Health and Safety Plan will be kept with field personnel on-Site at all times.

4.2 Field Quality Control Samples

All field QC procedures, field and laboratory QC samples, and laboratory analytical methods to be used during the EE/CA investigations are provided in the Avery Landing Quality Assurance Project Plan (QAPP) in Appendix A to this Field Sampling Plan. The primary laboratory for analysis of samples is Test America in Spokane, Washington. Split samples will be sent to OnSite Environmental in Redmond, Washington for analysis.

4.3 Sample Handling, Sample Shipment and Sample Custody

This section provides details on sample handling, shipment, and custody.

4.3.1 Sample Handling

All samples will be placed into appropriate containers as indicated in Tables QAPP-3 and QAPP-4 of the QAPP (Appendix A). All sample containers will be supplied by the project analytical laboratory.

As discussed previously, each sample will be assigned a unique identification number, which will be used on chain of custody sheets, sample labels, and field logbooks for identification and tracking purposes and for use in the project database. The samples will be labeled immediately after collection in the field with the sample identification number, location, depth, date and time of sample collection, and any special handling instructions.

All samples will be placed on ice in a cooler immediately after collection and during shipment to the laboratory. While awaiting shipment, samples will be stored temporarily in a secured area under custody by the sampler. All samples will be shipped in sealed ice chests with leak-proof ice-filled bags sufficient to maintain a temperature of approximately 4°C for 48 hours. Custody seals will be placed on each cooler or package of samples. Packing material will be used to prevent breakage and shifting of sample containers during shipping.

4.3.2 Sample Shipment

Samples will be transported to the analytical laboratory by common overnight express carrier or hand delivered. Samples will be shipped no later than five days following collection. The analytical laboratory will be notified of each sample shipment when samples are shipped. Documentation that

samples were received by the analytical laboratory shall be obtained via fax or email the day of arrival at the laboratory.

4.3.3 Sample Custody

Chain of custody documentation will be maintained for each sample collected. The chain of custody form will provide an accurate written record verifying that the samples were under appropriate custody at all times before arrival at the laboratory. Chain of custody will be conducted in accordance with Golder Technical Procedure TP 1.2-23 "Chain of Custody".

The chain of custody will be signed by each individual who has possession of the samples until they are delivered to the laboratory. A copy of the chain of custody will be retained for record management purposes. Each form will be placed in a water-tight plastic bag taped to the underside of the lid of the cooler containing the samples designated on the form. Coolers will be sealed with custody seals. Upon arrival at the laboratory, samples will be received and inspected by a laboratory representative. Samples contained in the shipment will be compared to the chain of custody to ensure that all samples were received and that analytical instructions are clear. The laboratory shall then provide confirmation to field personnel via fax that the samples were received.

4.4 Documentation Requirements and Record Management

All data collection and relevant field activities overseen by each field individual shall be documented in chronological order in a controlled permanently bound field logbook. Each logbook will be labeled with the project specific job number, project title, and sampling individual's name. All entries into the logbook will be made using blue or black permanent ink. Entries shall be legible, complete, and accurate. Sufficient information will to be recorded to allow the reconstruction of events based on entries without the reliance on personal recollections. Corrections will be made by drawing a single line through the revised text and initialing and dating the correction. Each page in the logbook will be signed and dated by the person responsible for the day's entries.

The information recorded in the logbook will include, but not be limited to, the following:

- Date of field activity
- Weather conditions
- Names of personnel present and activities being conducted
- Start and finish times of individual activities
- Descriptions of sample locations
- Descriptions of samples collected and time
- Relevant conversations

All samples will be recorded on Sample Data Sheets (SDS). The Sample Data Sheets will be kept in a 3-ring binder logbook maintained at the field Site. Sample Identification Numbers will be pre-printed and placed in the logbook for assignment to individual samples as they are collected. The logbook will be maintained by sample collection personnel onsite.

4.5 Decontamination of Drilling and Sampling Equipment

All direct sampling equipment (not including drill rods) will be decontaminated before the start of sampling activities and between each use. The sampling equipment will be washed with a nonphosphate detergent (Alconox or equivalent) solution using brushes to remove all visible dirt and grit. A tap or approved water rinse will be used to thoroughly remove all detergent solution followed by a rinse with dilute hydrochloric or acetic acid. The final rinse will be distilled/deionized water. Should soil or other visible matter remain on the sampling equipment after the detergent/water wash, a wet tap water towel will be used to remove material and the full-complement of decontamination procedures repeated. If the material cannot be removed, the equipment will be retired and not used again. All decontamination rinsates produced during sampling will be collected in suitable containers for temporary on-site storage. The results of the soil sampling and analysis will be used to determine appropriate means of decontamination rinsate disposal. The decontamination rinsates will be disposed of in accordance with all applicable regulatory requirements. Further details on decontamination are provided in the QAPP (Appendix A).

Drill rods shall be either steam cleaned with a non-phosphate detergent and tap water or with an approved water source until all dirt and oil is removed.

4.6 Investigative Derived Waste

Investigation derived waste (IDW) will be generated on the Site during test pitting, well drilling, and well purging. All borehole waste cuttings will be containerized onsite during drilling activities as they are generated. Each container (likely a 55-gallon drum) will identify the specific borehole, from which the waste soils were derived, on its label. Soil cuttings will be monitored in the field using visual indicators, olfactory screening, and PID measurement techniques to indicate the presence of possible hazardous substances contained in the waste cuttings. Any waste cuttings determined or suspected to contain hazardous substances will remain containerized and will be disposed of as "investigative derived wastes" at an appropriate disposal Site. Laboratory analytical results will help determine the appropriate disposal method. If analytical results indicate that borehole waste cuttings do not contain hazardous substances, those containers will be declared as clean and will be emptied in an appropriate area on-Site.

Purge water associated with monitoring well installation and development will be contained and segregated in 55-gallon sealed drums (Type 17H) and stored on the Site at a remote location before off-site disposal. The drums will be labeled as outlined in the QAPP (see Appendix A). Groundwater quality data for each well will be used to characterize the purge water for proper disposal.

Used protective clothing, gloves, etc. will also be managed on the Site according to IDEQ requirements. These will be placed in 55-gallon labeled drums, stored adjacent to the purge water drums, and disposed of at a later date according to its chemical characteristics. Additional IDW sampling may be required before disposal of IDW at a licensed Site. Golder will work with Potlatch to manage IDW and may be able to dispose of it during the remedial action, with EPA approval.

5.0 BIBLIOGRAPHY

Ecology & Environment, Inc. 2007. *Avery Landing Site – Removal Assessment Report*, prepared for the U.S. Environmental Protection Agency, Contract Number EP-S7-06-02, TDD 07-03-0004, Seattle, Washington. April 10.

EPA (United States Environmental Protection Agency). 1994a. Soil Sampling. Standard Operating Procedure #2012. U.S. Environmental Protection Agency. Environmental Response Team. Available from: http://www.ert.org/media_resrcs/media_resrcs.asp.

EPA (United States Environmental Protection Agency). 1994b. General Field Sampling Guidelines. Standard Operating Procedure #2001. U.S. Environmental Protection Agency. Environmental Response Team. Available from: http://www.ert.org/media_resrcs/media_resrcs.asp.

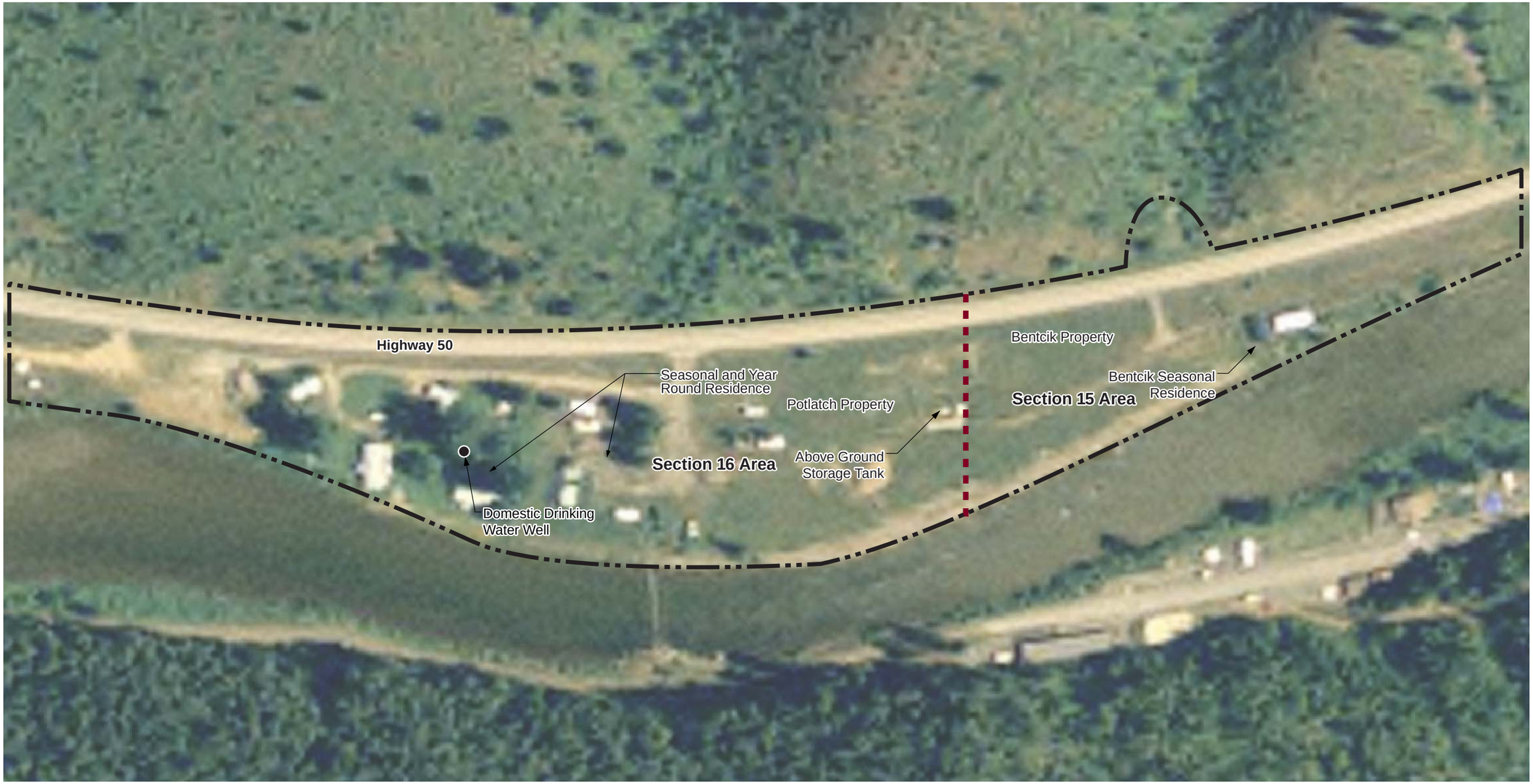
EPA (United States Environmental Protection Agency). 1995. Light Nonaqueous Phase Liquids. Ground Water Issu. U.S. Environmental Protection Agency. Authored by Charles J. Newell, Steven D. Acree, Randall R. Ross, and Scott G. Huling. EPA/540/S-95/500.

Hart Crowser, Inc. 2001 through 2004. Quarterly Performance Reports, Avery Landing Recovery System, prepared for Potlatch Corporation.

FIGURES

Source: Ecology and Environment, Inc., 2007

FIGURE **SAP-1**
SITE LOCATION MAP
EE/CA WORK PLAN AVERY LANDING SITE/WA



LEGEND

- Property Line & Section 16-15 Division Line
- Site Boundary

0 140

APPROXIMATE SCALE IN FEET

FIGURE **SAP-2**
SITE LAYOUT MAP
EE/CA WORK PLAN AVERY LANDING SITE/WA

Golder Associates

LEGEND

- Property Line & Section 16-15 Division Line
- Site Boundary
- EPA Monitoring Well
- EPA Soil Boring
- Monitoring Well
- Domestic Well
- Surface Water Sample Location
- Proposed EE/CA Monitoring Well
- Proposed River Sediment and Floating LNAPL and Surface Water Sampling Location
- Proposed Test Pits for Soil Sampling
- Proposed Borehole for Soil Sampling
- Proposed Angled Borehole for Soil Sampling
- Treatability Study Test Pits

0 140

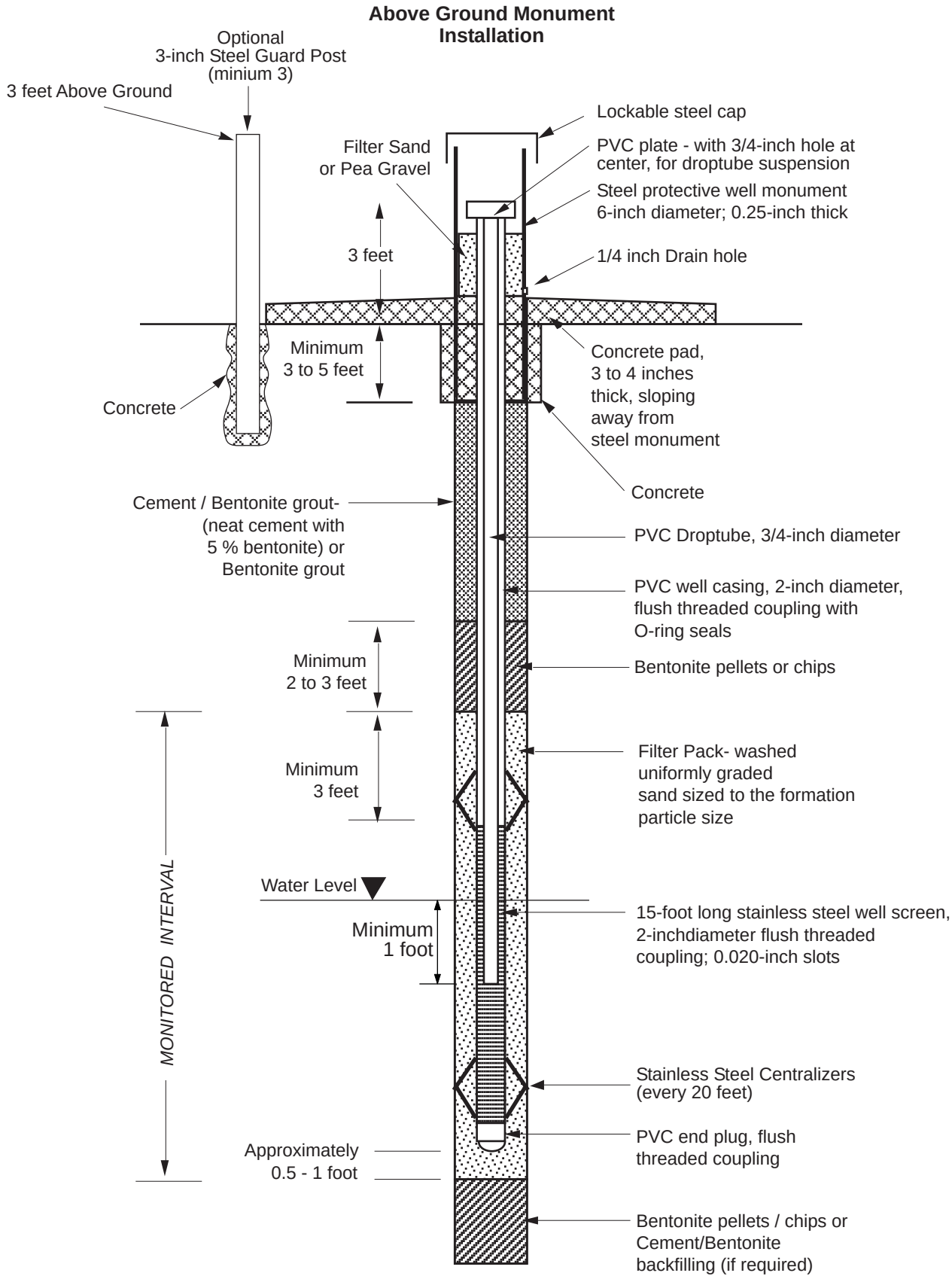
APPROXIMATE SCALE IN FEET

FIGURE **SAP-3**

EE/CA INVESTIGATION SAMPLING LOCATIONS

EE/CA WORK PLAN AVERY LANDING SITE/WA

Golder Associates



NOT TO SCALE

FIGURE **SAP-4**
SCHEMATIC MONITORING WELL INSTALLATION DIAGRAM
EE/CA WORK PLAN AVERY LANDING SITE/WA

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200
Redmond, WA USA 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498
www.golder.com

Golder Associates

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN FOR ENGINEERING EVALUATION / COST ANALYSIS AT THE AVERY LANDING SITE AVERY, IDAHO

Submitted to:

Mr. Terry Cundy
Potlatch Land and Lumber, LLC

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington

Douglas J. Morell, Ph.D., P.G., P.Hg.
Principal

Tom Stapp
Senior Chemist

June 23, 2009

073-93312-02.002

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

GLOSSARY

ACRONYM AND ABBREVIATION LIST

AOC	Administrative Order on Consent
ARAR	applicable, relevant, or appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EE/CA	Engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
Golder	Golder Associates Inc.
HASP	Health and Safety Plan
IDEQ	Idaho Department of Environmental Quality
ICN	Interim Change Notice
IDW	Investigative derived waste
LCS	Laboratory control sample
MCL	Maximum contaminant level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MS/MSD	Matrix spike and matrix spike duplicate
µg/L	Microgram/liter
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons for diesel and extended range organics
NWTPH-HCID	Northwest Total Petroleum Hydrocarbons for hydrocarbon identification
PAHs	Polynucleated aromatic hydrocarbons
Potlatch	Potlatch Land and Lumber, LLC and Potlatch Corporation
PRP	Potentially Responsible Party
PQL	Practical quantitation limits
QC	Quality Control
QAPP	Quality Assurance Project Plan
SID	Sample Integrity Data
SAP	Sampling and Analysis Plan
Site	Avery Landing Site, Avery Idaho
Work Plan	Engineering Evaluation/Cost Analysis Work Plan for the Avery Site

1.0 INTRODUCTION

1.1 Project Objective

This Quality Assurance Project Plan (QAPP) is prepared for removal actions at the Avery Landing Site (Site), and in support of the Engineering Evaluation / Cost Analysis (EE/CA) Work Plan (Work Plan) prepared by Golder Associates Inc. (Golder) for Potlatch Land and Lumber, LLC (Potlatch). This QAPP is Appendix A to the Sampling and Analysis Plan (SAP) and will be used in conjunction with the Work Plan. The QAPP was prepared in substantial accordance with the document EPA QA/R-5, 'EPA Guidance for Quality Assurance Project Plans' (EPA, 2001) and provides procedures for making accurate measurements and obtaining representative, accurate, and precise analytical data.

1.2 Site Background and History

The Site is located in the St. Joe River Valley in the Bitterroot Mountains in northern Idaho and encompasses approximately 10 acres. The Site borders the St Joe River about 0.75 miles west of the town of Avery, Idaho. The Site was used as a Milwaukee Railroad maintenance and fueling station from 1907 to 1977, and contained a railroad roundhouse, maintenance, repair, and fueling depot. Presently the Site is relatively flat ground with gravel and sparse vegetative growth and few structures remain.

There are primarily four properties located on the Site: The Federal Highway Administration property includes Highway 50 and its easement; the Bentcik property includes the eastern half of the Site with numerous monitoring wells and piezometers for monitoring groundwater; the Potlatch property with several buildings and utility hook-ups on its western portion and, the State of Idaho property consisting of the bed and banks of the St. Joe River. A domestic groundwater supply well is in the western portion of the Potlatch property for use by residents and visitors. The eastern portion of the Potlatch property is vacant with numerous monitoring wells and piezometers that are used for monitoring groundwater.

The Work Plan has been developed pursuant to an Administrative Order on Consent (AOC) agreed to between Potlatch and the U.S. Environmental Protection Agency (EPA). This QAPP is prepared to establish quality procedures for the collection, handling, transport, analytical testing, and data review process for all samples acquired to characterize the Site.

1.3 Site Description

A discussion of the Site is provided in Section 2 of the Work Plan. Site Location figures and maps are included with the Work Plan.

1.4 Sampling Program Design

A detailed description of Site objectives is provided in Section 1.2 of the Work Plan, with the overall intent to provide a range of removal/treatment options, with appropriate analyses of their effectiveness, cost and ability to be implemented in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Clean Water Act (CWA) requirements for the Site. Sampling locations and frequency, and the sampling procedures and analyses to be performed are presented in the SAP as Attachment B to the Work Plan. The locations of known impact to the Site are described in the text and illustrated on figures of the Work Plan.

2.0 PROJECT ORGANIZATION

2.1 Organizational Structure

The organizational structure for field activities at the Potlatch property is shown graphically in Figure QAPP 1-1. All key project personnel can be reached at the following addresses:

	Golder Project Manager	Golder Field Task Leader	PRP Project Coordinator
Contact:	Mr. Douglas Morell dmorell@golder.com	To Be Determined	Mr. Terry Cundy Terry.Cundy@potlatchcorp.com
Company:	Golder Associates Inc.	Golder Associates Inc.	Potlatch Land and Lumber, LLC
Address:	18300 NE Union Hill Road, Suite 200 Redmond, Washington 98052-3333	1200 W. Ironwood Drive, Coeur d'Alene 99201	530 S. Asbury, Suite 4 Moscow, ID 83848
Phone:	(425) 883-0777 Work	(208) 676-9933 Work Cell (208) 755-3002	208-883-1668 Work Cell 208-301-0410
Facsimile:	(425) 882-5498	(208) 676-8602	N/A

Project Manager

Project Manager, Mr. Douglas Morell, is responsible for planning and coordinating all Golder activities to meet scheduling requirements. Mr. Morell will be involved in day to day discussions with the Potlatch PRP Project Coordinator, and collaboration with the Golder Field Task Leader. He will provide guidance on analytical interpretation, quality assurance efforts, and all report products. He will also provide review for the technical quality, interpretations and conclusions presented in the Removal Report.

Field Task Leader

Field Task Leader, To Be Determined, is responsible for planning and executing all environmental sampling and analysis, for preparation of analytical data reports, preparation of the removal report and all associated Technical Memoranda including submittals to EPA with oversight from the Project Manager. The Field Task Leader prepares the specifications for, and administers the subcontracts for laboratory analysis. The Quality Assurance Coordinator reviews aspects of quality control. Work plan tasks, referenced method quantitation limits, regulatory compliance levels, and other pertinent documents will be reviewed and assessed to determine if data quality objectives are being met.

Health & Safety Officer

Health and Safety Officer, Ms. Jane Mills, C.S.P. is responsible for developing the site Health and Safety Plan (HASP) and communicating the key elements of on-site safety to the field personnel, including personal protective measures and equipment, emergency preparedness, and incident protocol. Due to the remoteness of the Site, Ms. Mills will also ensure adequate communication equipment is available to field personnel for contact in case of field mishaps.

Chemist/Validator

The Chemist/Validator, Mr. Tom Stapp reports to the Project Manager. He is responsible for coordinating with the offsite laboratories to obtain required analyses, and for sample tracking, chain of custody, and other sampling and analysis documentation. The Chemist/Validator maintains the data center files, including tabulating, compiling, and archiving data. The Chemist/Validator is responsible for the review and validation of laboratory analysis reports.

Investigative Field Team

The Investigative Field Personnel report to the Project Manager. Golder's Investigative Field Team To Be Determined and Ms. Bryony Stasney, L.G., L.Hy., Hydrogeologist. These individuals are responsible for collecting all field samples in accordance with the Work Plan, SAP and QAPP. In addition, the Field Personnel are responsible for assembly, organization, and maintenance of all information collected during field activities (including sampling logbook, field parameter records, daily activity logbook, chain-of-custody forms, and water-level measurements).

Golder Remedial Design Team

The principle members of the Golder Remedial Design Team will be lead by Mr. Tim Martin P.E. Design Leader in consultation with Mr. Morell. Golder will also rely on Mr. Lee Holder, P.E., Process Engineer as part of the Golder Environmental Remediation Group to bring innovative ideas towards realizing an effective cleanup action.

2.2 Use of Subcontractors

Golder will use local support contractors as needed for project execution. A surveyor will be selected as needed if additional Site characterization is required, and will be licensed in the State of Idaho for conducting geodetic surveys. Contractors involved in earth moving, push-probe sampling, drilling, or test pit excavation as needed, will also be licensed in the State of Idaho. The subcontracted laboratory, Test America, Inc., is located in Spokane, Washington and conforms to national standards for laboratory accreditation and use of EPA sponsored analytical methodologies. Golder field personnel will ensure the work performed by these subcontractors is in conformance with Golder Technical Procedures.

Subcontractors in the field that may become exposed to Site chemicals must have crew members with current OSHA 40 hour Health and Safety training on-site in substantial compliance with federal regulations. Training certificates for each worker must be maintained on-site during working hours for the duration of the project. Each certificate should have the worker name, date of attendance for the 40 hour training or refresher course, and signature of attending instructor.

Analytical Laboratory

The selection of an appropriate laboratory is based upon the need for data quality, timeliness, and logistics for sample transport and proper handling of samples to meet holding times. The primary laboratory is located near northern Idaho and meets these requirements.

- Test America Analytical Services in Spokane, Washington. (Formerly, North Creek Analytical), will serve as the prime laboratory for certified analysis. Test America / Spokane will facilitate the handling of all samples and may transfer some test requirements to a 'sister' laboratory in Bothell, Washington (Test America / Bothell). Test America holds, as a broad national network of laboratories, current accreditation in the states of Idaho and Washington for petroleum analyses associated with groundwater, drinking water, soils and solid wastes, using a variety of methods. The methods include Washington State Department of Ecology guidance for petroleum hydrocarbons (Ecology, 1997), the EPA SW-846 manual of "Test Methods for Evaluating Solid Wastes" (EPA, 1986), or the Environmental Monitoring Systems Laboratory (EPA, 1994) manual for drinking water tests. Tests for water samples that have potential use as drinking water will be sent to the Test America / Bothell laboratory, since that laboratory currently holds accreditation with the State of Idaho for analysis of drinking water standards for water analytes of concern that are included in Tables QAPP-5 through QAPP-9.

Test America Contact: Ms. Randy Decker (509) 924-9200

Test America, Spokane, Washington
Accreditation Status: Washington State Department of Ecology
Accreditation # C1259 (Laboratory ID)
Expires, January 6, 2010

Test America, Bothell, Washington
Accreditation Status: Idaho State Bureau of Laboratories
Accreditation is approved through the Idaho Department of Health & Welfare (EPA Laboratory ID # WA01217)
Expires, June 30, 2009

- On-Site Environmental, Inc. is a western Washington laboratory, accredited in the State of Washington for analytical methods created by the EPA, Standard Methods, and ASTM, for total petroleum hydrocarbon methods. Their methods are appropriate for groundwater, drinking water, soils and solid wastes. On-Site Environmental will be used as a backup laboratory, for split samples, and for confirmational analysis.

On-Site Environmental Contact: Mr. Blair Goodrow (425) 883-3881

On-Site Environmental, Inc., Redmond, Washington
Accreditation Status: Washington State Department of Ecology
Accreditation # C1309 (Laboratory ID)
Expires, July 26, 2009

3.0 DATA QUALITY OBJECTIVES

3.1 Appropriate Analytical Methods

An objective of the field sampling activities is to provide analytical data that is of known and defensible quality. Tables QAPP-4 through QAPP-9 list all analytical parameters of interest defined for groundwater and soil sampling during the site investigation. The complete list of parameters may include analyses using:

- Northwest Total Petroleum Hydrocarbons for diesel and extended range organics (NWTPH-Dx)
- EPA SW-846 methods for poly-aromatic hydrocarbon compounds and naphthalene (EPA SIM 8270C)
- EPA SW-846 methods for Target Compound List (TCL) semi-volatile organic compounds (SVOC [EPA 8270C])
- EPA SW-846 methods for Target Analyte List (TAL) metals in soil (EPA 6010C/ 6020A) and groundwater (EPA 200.7/ 200.8). Mercury will be analyzed using EPA 7470A
- EPA SW-846 methods for polychlorinated biphenyls (PCBs) in soil and water (EPA 8082A)
- EPA SW-846 methods for TCL volatile organic compounds (VOC [EPA 8260B]).

All well water and surface water samples will have standard field parameters measured including temperature, pH, conductivity, dissolved oxygen, and turbidity.

Petroleum constituents (diesel and heavy oil) will be analyzed using northwest methods for petroleum hydrocarbons (NWTPH-Diesel Extended) (Ecology, 1997). EPA test methods for TCL SVOCs, PCBs, TCL VOCs, and TAL metals are as defined in SW-846 (EPA, 1986) as applicable.

The objectives for analytical data quality are defined in terms of the quantitation limits achievable using the referenced analytical methods, and in terms of the resulting goals for precision, accuracy, representativeness, completeness, and comparability of analytical data. Quantitation limits are provided for each analytical parameter in Tables QAPP-4 through QAPP-9 and are cross-referenced to applicable standard reference methods. The quality objectives established for the EE/CA investigation and monitoring are described as follows:

- Precision: Analytical precision shall be reported as required by the governing reference methods cited in Tables QAPP-4 through QAPP-9. At a minimum, data validation criteria for analytical precision will reference the governing methods.
- Accuracy (Bias): Accuracy shall be reported as required by the governing reference methods cited in Tables QAPP-4 through QAPP-9. At a minimum, data validation criteria for analytical accuracy will reference the governing methods.
- Representativeness: Goals for sample representativeness are addressed qualitatively by the sampling locations and intervals defined in the SAP. In addition, the use of standard procedures for sample acquisition (as described in Section 4 of this QAPP) will facilitate the collection of representative data.

- Completeness: Completeness is defined as the percentage of valid analytical determinations with respect to the total number of requested determinations in a given sample delivery group; completeness goals are established at 90 percent. Failure to meet this criterion shall be documented and evaluated in the data validation process described in Section 6 of this QAPP, and corrective action taken as warranted on a case-by-case basis.
- Comparability: Approved analytical procedures shall require the consistent use of the reporting techniques and units specified by the reference methods cited in Tables QAPP-4 through QAPP-9 in order to facilitate the comparability of data sets from sequential sampling rounds and from split laboratory submissions in terms of their precision and accuracy.

4.0 SAMPLING AND OTHER FIELD PROCEDURES

4.1 Selected Procedures, by Task

Technical procedures have been developed to support sampling activities, monitoring actions, data validation, and other technical activities. Reference to technical procedures applicable to individual activities, are provided in Table QAPP-1, ('Golder Technical and Quality Procedures List'), and complete copies are kept on file in Golder archives. Field team members have unlimited access to the technical procedures and generate or review copies as needed to maintain the quality steps necessary to complete field activities.

Technical procedures are provided as guidance to technical personnel and as such, require the specific circumstance of application or the knowledge of the field scientist to appropriately apply the guidance criteria. Some technical procedures may have duplicate or similar information provided in other technical procedures that is necessary to be included to provide continuity to the content of the document. Significant changes from the guidance provided in the technical procedures will be identified and documented using procedures in the following section.

4.2 Document Distribution, Variation Request, and Change Control Considerations

The technical procedures and all other procedures cited in this QAPP are subject to the distribution control requirements of Quality Procedure QP-5.1, "Document Preparation, Distribution, and Change Control." Variations from established field procedure requirements may be necessary in response to unique circumstances encountered during sampling activities. All such variations must be documented on a Field Change Request (FCR) form and submitted to the Project Manager for review and approval. A copy of the Field Change Request form is presented in Technical Procedure TP-1.2-23 "Chain of Custody".

The Project Manager or his assigned Field Sampling Personnel are authorized to implement non-substantive variations based on immediate need, provided that the Project Manager is notified within 24 hours of the variation, and the FCR is forwarded to the Project Manager for review within 2 working days. Substantive variations require notification of the Project Manager and Client Project Coordinator before implementation and a FCR is forwarded for review within 2 working days. If the variation is unacceptable to either reviewer, the activity shall be re-performed or other corrective action taken as indicated in the "Comments" section of the FCR. A copy of the FCR shall be included with all field reports, as well as the data validation report. Changes to the requirements of this QAPP or the EE/CA Work Plan shall be controlled through the Interim Change Notice (ICN) procedures as discussed in Section 6.5.2 of QP-5.1.

4.3 Sample Quantities, Types, Locations, and Intervals

Sample quantities, types, locations, and intervals for the groundwater, surface water and soil sampling shall be as specified in the Work Plan and SAP. Field quality control samples shall be included in the minimum quantities specified in Section 7 of this QAPP. Appropriate documentation of the purpose of the sample shall be maintained in the field log, and identified by the assigned sample number; copies of sample identification records shall be separately provided to the data validator. See Section 6 of this QAPP.

4.4 Sample Identification and Labeling Requirements

Sample labels will be attached to each sample container with an assigned field sample identification number applied as each sample is collected during the field activities. The sample identification

numbering scheme will be as determined during the field sampling event and will be explained in the field notebook and/ or recorded on the Sample Integrity Data (SIDs) sheets. SIDs shall be completed for all surface water and well water sample collection locations where field parameter data will also be collected. The number system will appear on each sample bottle or container collected and will identify a unique sample identification number applied to one collection sequence for one sample, regardless of the number of bottles and containers collected. The number system will ensure field quality control (QC) samples will remain indistinguishable from the field locations. The label will contain the sampler's initials, one collection date, and one collection time appropriate for each sample, and will be cross referenced by the sample number to identify the location, depth, and monitoring well or geological data in the field notes. An example label is shown below:

GOLDER ASSOCIATES INC.
(425) 883-0777
Sample ID #: 06P09-10.5
Date:
Time:
Initials: Analysis: Preservative:

Each sample bottle label will also identify the laboratory analysis to be performed, noting the identified method number as stated in Tables QAPP-5, QAPP-6, QAPP-7, QAPP-8, and QAPP-9 and the preservative added for the appropriate analytical parameter as indicated on the bottle label. Identification numbers shall be recorded in the field notebook, SIDs, and on the chain of custody/sample analysis request form supplied by the analytical laboratory.

4.5 Sample Container Type, Volume, Preservation, and Handling Requirements

All sample containers, container preparation, preservatives, trip blank, and sample storage chests shall be provided by the analytical laboratory as part of their agreement for services. Sample container type, volume requirements, preservation requirements, and special handling requirements are listed by analytical category in Table QAPP-2 for groundwater, and Table QAPP-3 for soil.

All samples shall be sealed, labeled, properly identified, and submitted to the analytical laboratory under formal chain of custody requirements as described in Section 4.6 of this QAPP. Transport sample chests will be secured with a custody seal on the outside, with signature and date provided by the attending field scientist.

4.6 Chain of Custody Considerations

All samples obtained during the course of this investigation shall be controlled as required by procedure TP-1.2-23, "Chain of Custody". Chain of custody forms shall be completed for each shipment of samples as described in the procedure. Chain of Custody forms shall specifically identify the applicable reference methods specified in Tables QAPP-5 through QAPP-9 as appropriate for each individual sample. All laboratory sample tracking procedures shall ensure traceability of analytical results to the original samples through the analytical method referenced on the chain of custody, and the laboratory applied tracking number. The laboratory tracking number will be traceable to unique sample identification numbers as specified in Section 4.4 above.

4.7 Sampling Equipment Decontamination

All non-dedicated sampling equipment (in contact with sample) shall be thoroughly cleaned prior to each sampling event to prevent cross-contamination between samples and to ensure accurate representation of analytes of interest in each sample interval. Non-dedicated equipment shall be cleaned with a brush and non-phosphate detergent, water mixture so that all visible solid matter is removed. A second wash is performed after the detergent/water wash. Steam cleaning may be conducted on excavation equipment used at locations targeted for sampling or down-hole soil sampling equipment in place of hand washing. Sampling tools shall be disassembled or staged as necessary pending their next use. Sampling tools shall be placed in clean, dedicated drums or sealed in clean plastic bags to protect from ambient contamination. Personnel performing decontamination shall wear rubber gloves, face or eye shields, and such other safety equipment as directed by the project-specific HASP.

Should visible matter remain on the non-dedicated equipment after the detergent/water wash, the full complement of wash procedures shall be repeated. If the non-dedicated equipment retains visible matter after the repeated actions, the equipment will be retired from the sampling procedures and not used again. Samplers shall be reassembled using clean rubber gloves; all decontaminated samplers and sampling tools shall be sealed in clean plastic bags pending their next use. All wash and rinse fluids shall be transferred to storage drums for short-term storage on-site, pending characterization and final disposal at the direction of the Project Manager.

4.8 Investigative Derived Wastes (IDW)

Soil cuttings, and borehole residuals may be generated as investigative derived solid waste material that cannot, or otherwise will not be returned to the borehole. Likewise, purge water from well locations will be identified as investigative derived liquid waste (IDW) that must be containerized. The investigative derived waste is the responsibility of the field scientist at the time the IDW is generated. Solid and liquid IDW will be separated and segregated to the extent possible. Solid IDW that can be determined in the field to be non-impacted or minimally impacted, will be sequestered from heavily impacted soils for future designation. Heavily impacted IDW will be containerized. In most cases the IDW will be stored in steel drums (Type 17H) at the site. Each drum shall be labeled by the field scientist, secured with a bolted lid, and placed at the job site in a location where the potential for tampering is minimized. The label requirements will include identification of the contents, the IDW matrix, the date of generation, and a phone number contact for the Golder Project Site manager.

Soil and water samples generated for testing purposes will become the responsibility of the laboratories tasked for the appropriate analyses. As such, all disposal responsibilities will remain with each laboratory at the conclusion of the testing activities for spent samples.

4.9 Calibration Requirements

Calibration of all measuring and test equipment, whether in existing inventory or purchased for this investigation, shall be controlled as required by procedure QP-11.1, "Calibration and Maintenance of Measuring and Test Equipment." Lease equipment shall require certifications or other documentation demonstrating acceptable calibration status for the entire period of use for this project. Field calibration requirements shall be in compliance with the technical procedure describing the instrument's use and/or with the manufacturer's instructions issued with the equipment. Method and analytical equipment-specific calibration requirements applicable within the individual analytical laboratories are addressed by the individual laboratory QA plans or the analytical method.

5.0 ANALYTICAL PROCEDURES

Tables QAPP-4 through QAPP-9 cross-reference the analytes of interest of this investigation to the standard reference methods. Practical quantitation limits (PQLs) for analytes in soils and water samples are given and shall be established as contractual requirements between Golder and the subcontracted analytical laboratory. The subcontracted laboratory is responsible for implementing the analytical methods selected, documenting through Standard Operating Procedures (SOP) modifications (if any) to the methods, and providing these documents for review upon request. Any changes to the method number selected for analysis and identified in Tables QAPP-4 through QAPP-9 must first be brought to the attention of the project manager in writing before analysis can begin.

The contractual requirements for PQLs in soils and water samples are based on potential applicable, relevant, or appropriate requirements (ARARs) established for the site work under State and Federal regulations as indicated in Table QAPP-4 through QAPP-9. PQLs and/or method detection limits (MDLs) in most cases meet the most stringent regulatory screening criteria, which are presented in Tables QAPP-5 through QAPP-9 and Attachment 1 of this document. However, for example the PQL for thallium can be found "shaded" in Table QAPP-5, since the laboratory PQL exceeds the most stringent ARARs considered for the site. Therefore, since the established method is one of the best available technologies for determination of this analyte, laboratories may be asked to report data below the PQL, and down to the MDL to determine a viable value. As a consequence, this value will be identified as "estimated" in accordance with data validation criteria for analytes that fall below the 99% confidence criteria.

Instances of PQLs found above the most protective cleanup level will be brought to the attention of the Project Manager and analytical results will be assessed by matrix and location at the conclusion of the Remedial Investigation. All other PQLs shall be considered adequate for the removal and remedial actions for soil and water samples.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 Minimum Requirements for Laboratory Analytical Data Packages

All analytical data packages submitted by the analytical laboratory shall consist of EPA Contract Laboratory Program (CLP) equivalent deliverables and include the following:

- Sample receipt "condition found" records, noting dates of sample collection, shipment, laboratory receipt, and disposition of sample quality including temperature, breakage, and custody seals.
- Shipping receipt documentation including identification of shipping personnel (or organization).
- Copies of completed chain of custody documentation including communications of field personnel by hand written note, facsimile, or e-mail transmittal.
- Analytical hard copy (paper) summary results for each sample containing neat or dilution adjusted results for all analytes/constituents requested in the chain of custody and request for analysis or purchase order.
- Analytical quality control results and summary documents for laboratory method blanks, laboratory duplicates, laboratory control samples, blank spike/blank spike duplicates, matrix spike/matrix spike duplicates, serial dilutions, quality reference materials, surrogates and internal standards.
- Sample extraction and preparation summary data including dates of sample extraction and analysis and analytical sequence information for each sample set, and each sample dilution and reanalysis.
- A cross-reference of laboratory sample to project sample identification numbers, a description of data qualifiers, sample preparation and analysis methods, raw data for sample results and laboratory QC samples, results of dated intial and continuing calibration cheks, GC tuning results, and labeled/dated chromatorgrams/spectra.
- Electronic data diskettes or electronic deliverables that provide the summarized results, date of extraction and analysis, quality control data results and true values, client and laboratory sample identifications, analysis methods, dilutions applied and appropriate detection or reporting limits.

All data packages for all analytical parameters shall be reviewed and approved by the analytical laboratory's QA Officer before submittal for validation.

6.2 General Validation Requirements

All analytical data packages from each sample delivery group shall be validated by the detailed review and calculation over-check processes described in "U.S. EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review" (EPA, 2001) and "U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA, 2004). Data validation work will be performed in order to ensure that the laboratory has met all contractual requirements, all applicable reference method requirements, and has met the data quality objectives discussed previously in Section 3 and listed in Tables QAPP-5 through QAPP-9. Validated data will be stored as indicated in procedure TP-2.2-12, "Analytical Data Management" for each sample delivery group. A sample delivery group may be interpreted as a group of 20 samples, or the group of samples delivered to the laboratory in a single sampling event.

The data validator shall document all contacts made with the laboratory to resolve questions related to the data package. The data validator shall complete a data validation checklist applicable for the specified method, documenting the evaluation of holding times, laboratory and field blanks, laboratory and field duplicates, matrix spikes/matrix spike duplicates, laboratory control samples, method calibration data, internal standards, surrogates, and any qualification of analytical results required as a consequence of QC deficiencies. The validation checklist, laboratory contact documentation, copies of the laboratory sample summary reports, and the as-reviewed laboratory data package shall be routed to the Project Manager for data assessment purposes and to the permanent project records.

7.0 QUALITY CONTROL PROCEDURES

All analytical samples shall be subject to quality control (QC) measures in both the field and laboratory. The following minimum field quality control requirements apply to all analyses. These requirements are adapted from "Test Methods for Evaluating Solid Waste" (EPA 1986).

- ***Field duplicate samples.*** Sufficient sample quantities of soil and water for field duplicates will be collected at a frequency of one duplicate per sampling event, or once every 20 samples, whichever is greater. The field duplicates for water samples will be collected from the identical sample stations as stated in the SAP and as close to the original sample collection time as feasible, using identically prepared and preserved containers. Field duplicates will be collected of soil and water samples that are suspected of containing moderate levels of contaminants, based upon field observations. All field duplicates shall be identified with a unique sample identification number and will be analyzed independently as an indication of gross errors in sampling techniques.
- ***Field split samples.*** Sufficient sample quantities for field splits will be collected at a frequency of one split sample per sampling event, or once every 20 samples, whichever is greater. Field split samples will be collected at locations consistent with the SAP. The field splits for soil will be collected from homogenized composite quantities prepared in the field as stated in the SAP. The field splits for water samples will be collected from the identical sample stations as stated in the SAP and as close to the original sample collection time as feasible. The split samples shall be collected using the same equipment and sampling technique, and shall be placed into identically prepared and preserved containers. The field split samples shall be identified with a unique sample ID number and presented to the subcontract laboratory tasked with confirmation and backup analyses for the purpose of monitoring inter-laboratory precision.
- ***Field blanks [Water].*** Preparation of field blanks will be required for analyses of water samples. Field blanks for water samples will be established at a frequency of one blank sample per type of equipment being used per sampling event, or once every 20 water samples, whichever is greater. Field blanks for water samples consist of each of the following; 1) pure deionized/ distilled water added to the same batch of clean water sample containers and preservative used in the sampling event as a check on possible contamination originating from container preparation methods, shipment, handling, storage, preservatives or site conditions; and 2) pure deionized/ distilled water washed over non-dedicated equipment used for collection of surface and groundwater samples, as a check on possible carry-over contamination originating from inadequate decontamination of field equipment and field conditions. Field blanks for water samples shall be prepared in the field and submitted to the laboratory as a water sample.
- ***Field blanks [Soil].*** Preparation of field blanks will be required for non-dedicated field equipment subject to decontamination procedures. Field blanks for field equipment will be established at a frequency of one blank sample per field sampling campaign. Field blanks for field equipment consist of pure deionized/ distilled water rinsed through a piece of equipment that has undergone the decontamination steps as outlined in Section 4.7. The rinse water collected shall be added to the same batch of clean water sample containers and preservative used during the sampling event. Field blanks for field equipment shall be submitted to the laboratory as a water sample. Field blanks for field equipment are used as a check on possible contamination carry-over from field equipment that may not have been properly decontaminated between sample collection stations.

The internal quality control checks performed by the analytical laboratory shall meet the following minimum requirements:

- ***Matrix spike and matrix spike duplicate samples.*** Matrix spike and matrix spike duplicate (MS/MSD) samples require the addition of a known quantity of a representative analyte of interest to soil or water samples as a measure of recovery percentage. The laboratory shall be instructed to select the extra sample material provided with a given sample batch for the purpose of reporting MS/MSD recovery. The substitution of non-project related samples for MS/MSD reporting shall not be allowed to replace the Site specific selection of material for MS/MSD. Spike compound selection, quantities, and concentrations shall be described in the laboratories analytical procedures. One sample shall be spiked per analytical batch, or once every 20 samples, whichever is greater.
- ***Quality control reference samples (check samples).*** A quality control reference sample (also known as a Laboratory Control Sample; LCS) shall be prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range established for the samples. The quality control reference sample is analyzed after the initial calibration and before any samples are analyzed, and shall be run with every analytical batch, or every 20 samples, whichever is greater. Reference samples are required as an independent check on analytical technique and methodology. Successful LCS recovery shall be maintained within a 90 to 110% acceptance range.
- ***Method blanks.*** Method blanks are prepared during the preparation of both soil and water samples in the laboratory to determine the proficiency of the laboratory at eliminating fugitive vapors, reagent contaminants, and preparation vessel carryover contaminants. The method blank shall be prepared using the same procedure used for preparation of the samples, at the same time, and involving the same reagents. The method blank must be tested after the quality control reference sample and before any samples are analyzed, and shall be run with every analytical batch or 20 samples, whichever is more frequent.

8.0 DATA ASSESSMENT PROCEDURES

As previously discussed in Section 6 of this QAPP, analytical data shall first be compiled by the analytical laboratory, and reduced to include the specified deliverable elements. The data will be validated by project personnel in compliance with existing validation guidelines and submitted to the Project Manager for data assessment, and to the Client. Data assessment will be performed on the distributions and statistical characteristics of the validated data as established in the Work Plan and will consist primarily of comparisons of the data to applicable regulatory levels and historical data to assist in site characterization and completion of the removal report.

9.0 REFERENCES

(Ecology, 1997); *Analytical Methods for Petroleum Hydrocarbons*, Washington State Department of Ecology Toxics Cleanup Program and the Ecology Environmental Laboratory, Publication No. ECY 97-602, June, 1997

(EPA, 1986); *SW-846 Test Methods for Evaluating Solid Waste, Third Edition, Office of Solid Waste and Emergency Response*, USEPA, November, 1986, Rev. May, 1997

(EPA, 2001); *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review* (EPA-540/R-00/006) June 2001

(EPA, 2004); *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media/ Multi-concentration, ILM05.3*, March, 2004.

(EPA, 1994); *Guidance for the Data Quality Objectives Process, EPA QA/G-4*, Office of Research and Development, USEPA, (EPA/600/R-96/055), September 1994

(EPA, 2001); *EPA Guidance for Quality Assurance Project Plans*, EPA QA/R-5, (EPA/240/B-01/003), March, 2001.

(USEPA,1999); *USEPA Contract Laboratory Program Statement of Work for Organics, OLM04.2*, August 1999

(USEPA, 2004); *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media/ Multi-concentration, ILM05.3*, March, 2004.

TABLES

TABLE QAPP-1

Golder Technical and Quality Procedures List

TP-1.2-5	Drilling, Sampling, and Logging of Soils
TP-1.4-6a	Manual Groundwater Level Measurement
TP-1.2-6	Field Identification of Soil
TP-1.2-12	Monitoring Well Drilling and Installation
TP-1.2-18	Sampling Surface Soil for Chemical Analysis
TP-1.2-20	Collection of Groundwater Quality Samples
TP-1.2-23	Chain of Custody
TP-2.2-12	Analytical Data Management
QP-5.1	Document Preparation, Distribution, and Change Control
QP-10.1	Surveillance Inspection
QP-11.1	Calibration and Maintenance of Measuring and Test Equipment
QP-14.1	Corrective and Preventive Action
QP-16.1	Quality Assurance Records Management

The complete volume of each technical procedure is available from Golder files.

Sample Container Types, Volumes, Handling, Preservation, and Holding Times;

GROUNDWATER

Analytes	Analytical Method	Container Type	Special Handling	Preservation	Maximum Holding Time
Petroleum Hydrocarbons (Gasoline to Heavy Oil Range Organics)	NWTPH-HCID	1, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot if Lab QC is to be performed)	HCl, pH <2, store in dark at 4°C.	7 days for extraction, 40 days from date of extraction
Petroleum Hydrocarbons (Diesel Range Organics)	NWTPH-Diesel (extended range)	1, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	HCl, pH <2, store in dark at 4°C.	14 days for analysis
Polychlorinated biphenyl (PCBs) Organic Compounds	EPA 8082A (low level)	2, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect additional **2,000** mL aliquot for MS/MSD analysis if required)	None. Store in dark at 4°C.	7 days for extraction, 40 days from date of extraction
Volatile Organic Compounds (VOC)	EPA 8260B	3, 40 mL glass vial (VOA), Teflon-lined silicon septum cap;	Fill to overflow and cap to eliminate all air bubbles, (Collect an additional 3, 40 mL VOA vials for MS/MSD analysis if required)	HCl, pH <2, store in dark at 4°C.	14 days
Poly-aromatic Hydrocarbon (PAHs; Semi volatile Organic Compounds) and Naphthalene	EPA 8270C and EPA 8270 SIM	1, 1,000 mL narrow mouth amber glass bottles, lined-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	None. Store in dark at 4°C.	7 days for extraction, 40 days for analysis after extraction
Metals	EPA 200.7/ 200.8	1, 1,000 ml narrow mouth polymer bottle, with Teflon lined lid.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	HNO_3, pH <2, store in dark at 4°C.	180 days from sample collection. Mercury is 28 days from collection.
pH, Temperature, Conductivity, Dissolved Oxygen, Turbidity	See Table QAPP-2	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected

Sample Container Types, Volumes, Handling, Preservation, and Holding Times;

SOIL

Analytes	Analytical Methods	Container Type	Special Handling	Preservation	Maximum Holding Time
Petroleum Hydrocarbons (Gasoline to Heavy Oil Range Organics)	NWTPH-HCID	1, 4 oz. Wide mouth soil jar	Fill completely	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Petroleum Hydrocarbons (Diesel Range Organics)	NWTPH-Diesel (extended range)	1, 4 oz. Wide mouth soil jar	Fill completely, (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Polychlorinated biphenyl (PCBs) Organic Compounds	EPA 8082	1, 4 oz. Wide mouth soil jar	Fill completely	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Volatile Organic Compounds (VOC)	EPA 8260B	2, 40 ml VOA vials; 1 wide mouth 4-oz glass jar	Fill using EPA Method 5035A	None, store in dark at 4°C.	14 days to analysis
Poly-aromatic Hydrocarbon (PAHs; Semi volatile Organic Compounds) and Naphthalene	EPA 8270C and EPA 8270 SIM	1, 4 oz. Wide mouth soil jar	Fill completely, (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	14 days for extraction, 40 days for analysis after extraction
Metals	EPA 6010C / 6020A	1, 4 oz. Wide mouth soil jar, with Teflon lined lid.	Fill completely. (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	180 days from sample collection. Mercury is 28 days from collection.

Inorganic Field Parameter
Water Quality Criteria

Field Tests	Point of Compliance	Method[a]	Target Water PQL	Typical Instrument Applied[c]
Temperature	Purge water source	SM2550	0.1 deg. C	Golder Calibrated Mercury Thermometer
pH	Purge water source	EPA 150.1	0.05 units	Orion Model 250Aplus with Combination Glass Electrode.
Specific Conductance	Purge water source	EPA 120.1	5 :mhos	Orion Model 115Aplus with Epoxy 2 Electrode Conductivity Cell.
Turbidity	Purge water source	EPA 180.1	1 NTU	Hach 2100P with dual optical compensation.
Dissolved Oxygen	Purge water source	SM4500-O	0.1 mg/L	Orion Model 810Aplus with Combination Glass Electrode.

Notes:
a - Methods from SW-846, Test Methods for Evaluating Soild Waste (EPA, 1986); Methods for the Chemical Analysis of Water and Wastes (EPA-600/4-79-20; EPA1979); and Standard Methods for the Examination of Water & Wastes (1998, 20th Ed.)
b - PQL: Practical Quantitation Limits established by Manufacturers recommendation.
c - Orion and Hach are registered trademarks.

Potlatch Corporation / Avery Landing
Target Analyte List Metals
Screening Levels

				GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
Type	Analytes [a]	CAS #	Method[b]	Laboratory Water PQL[c]	Laboratory Water MDL[c]	**Lowest Regulatory Screening Criteria[d]**	Laboratory Water PQL[c]	Laboratory Water MDL[c]	**Lowest Regulatory Screening Criteria[d,e]**	Laboratory Soil PQL[c]	Laboratory Soil MDL[c]	**Lowest Regulatory Screening Criteria[d]**	Laboratory Soil PQL[c]	Laboratory Soil MDL[c]	**Lowest Regulatory Screening Criteria[d]**
				ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	**mg/Kg**
Metals	Aluminum	7429-90-5	6010 / 6020	80	0.46	**200**	80	0.46	**NSA**	30	8.9	**77,000**	30	8.9	**25,500**
Metals	Arsenic	7440-38-2	6010 / 6020	0.4	0.048	**0.045**	0.4	0.048	**50**	0.2	0.00078	**0.4**	0.2	0.00078	**5.9**
Metals	Antimony	7440-36-0	6010 / 6020	0.4	0.08	**6**	0.4	0.08	**5.6**	0.2	0.0066	**4.8**	0.2	0.0066	**2**
Metals	Barium	7440-39-3	6010 / 6020	1.2	0.054	**2,000**	1.2	0.054	**NSA**	0.5	0.015	**896**	0.5	0.015	**NSA**
Metals	Beryllium	7440-41-7	6010 / 6020	0.4	0.052	**4**	0.4	0.052	**NSA**	0.25	0.0012	**1.63**	0.25	0.0012	**NSA**
Metals	Calcium	7440-70-2	6010 / 6020	1,100	28	**NSA**	1,100	28	**NSA**	55	1.5	**NSA**	55	1.5	**NSA**
Metals	Cadmium	7440-43-9	6010 / 6020	0.4	0.028	**5**	0.4	0.028	**0.6**	0.2	0.00047	**1.35**	0.2	0.00047	**0.583**
Metals	Chromium	7440-47-3	6010 / 6020	0.4	0.074	**100**	0.4	0.074	**74**	1.3	0.047	**2,135**	1.3	0.047	**26**
Metals	Cobalt	7440-48-4	6010 / 6020	0.4	0.032	**11**	0.4	0.032	**NSA**	0.5	0.032	**23**	0.5	0.032	**50**
Metals	Copper	7440-50-8	6010 / 6020	1	0.03	**1,000**	1	0.03	**11**	1	0.22	**921**	1	0.22	**16**
Metals	Iron	7439-89-6	6010 / 6020	40	5.8	**300**	40	5.8	**NSA**	10	0.46	**5.8**	10	0.46	**20,000**
Metals	Lead	7439-92-1	6010 / 6020	0.4	0.034	**15**	0.4	0.034	**2.5**	0.2	0.001	**49.6**	0.2	0.001	**31**
Metals	Magnesium	7439-95-4	6010 / 6020	800	0.5	**NSA**	800	0.5	**NSA**	55	0.66	**NSA**	55	0.66	**NSA**
Metals	Manganese	7439-96-5	6010 / 6020	0.4	0.0124	**50**	0.4	0.0124	**NSA**	1	0.008	**223**	1	0.008	**460**
Metals	Mercury	7439-97-6	7470A / 7471B	0.04	0.003	**1**	0.04	0.003	**NSA**	0.02	0.0063	**0.0051**	0.02	0.0063	**0.174**
Metals	Nickel	7440-02-0	6010 / 6020	0.4	0.044	**209**	0.4	0.044	**52**	1	0.08	**59.1**	1	0.08	**16**
Metals	Potassium	7440-09-7	6010 / 6020	3,300	410	**NSA**	3,300	410	**NSA**	165	16	**NSA**	165	16	**NSA**
Metals	Selenium	7782-49-2	6010 / 6020	0.4	0.068	**50**	0.4	0.068	**5**	0.5	0.00188	**2.0**	0.5	0.00188	**2**
Metals	Silver	7440-22-4	6010 / 6020	0.4	0.03	**52**	0.4	0.03	**3.4**	1	0.045	**0.19**	1	0.045	**0.5**
Metals	Sodium	7440-23-5	6010 / 6020	2,000	180	**NSA**	2,000	180	**NSA**	100	6.8	**NSA**	100	6.8	**NSA**
Metals	Thallium	7440-30-4	6010 / 6020	0.8	0.012	**2**	0.8	0.012	**0.24**	0.4	0.004	**1.55**	0.4	0.004	**NSA**
Metals	Vanadium	7440-62-2	6010 / 6020	0.4	0.046	**180**	0.4	0.046	**NSA**	0.5	0.03	**2.40**	0.5	0.03	**NSA**
Metals	Zinc	7440-66-6	6010 / 6020	1.4	0.4	**3,129**	1.4	0.4	**120**	2.5	0.2	**886**	2.5	0.2	**98**

Notes:

NA - Not applicable.
NSA - No standard available.
Standard PQL or MDL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.
IDTL - Idaho Default Target Levels.
a - Target Analyte List Metals.
b - SW846 analytical method 6020 (ICP/MS).
c -Practical Quantitation Limit (PQL), Minimum Detection Limit (MDL) - established by the laboratory.
d - See Attachment 1 of the QAPP for a summary of regulatory screening criteria. Screening criteria includes information from the following sources:
National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].
Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.
Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards
EPA Removal Action Levels (September 2008).
EPA Risk-Based Regional Screening Levels (April 2009).
EPA Freshwater Sediment Screening Benchmarks (September 2008).
Buchman, M.F. NOAA Screening Quick Reference Tables (2008)
MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems".
e - Surface water criteria assumes a hardness at 100 mg/L

Potlatch Corporation / Avery Landing
PAH and Petroleum
Screening Levels

Type	CAS #	Analytesa	Methodb	GROUNDWATER			SURFACE WATER			SOIL[h]			SEDIMENT		
				Laboratory Water PQL[c]	Laboratory Water MDL[c]	**Lowest Regulatory Screening Criteria[d]**	Laboratory Water PQL[c,e]	Laboratory Water MDL[c,e]	**Lowest Regulatory Screening Criteria[d]**	Laboratory SOIL PQL[c]	Laboratory Soil MDL[c]	**Lowest Regulatory Screening Criteria[d]**	Laboratory SOIL PQL[c]	Laboratory Soil MDL[c]	**Lowest Regulatory Screening Criteria[d]**
				ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	**mg/Kg**
Carcinogen	56-55-3	Benzo(a)anthracene	SIM 8270C	0.01	0.005	**0.029**	0.01	0.005	**0.0038**	0.005	0.00043	**0.15**	0.005	0.00043	**0.01572**
	50-32-8	Benzo(a)pyrene	SIM 8270C	0.01	0.005	**0.0029**	0.01	0.005	**0.0038**	0.005	0.00025	**0.02**	0.005	0.00025	**0.0319**
	205-99-2	Benzo(b)fluoranthene	SIM 8270C	0.01	0.005	**0.029**	0.01	0.005	**0.0038**	0.005	0.00053	**0.15**	0.005	0.00053	**0.0272**
	207-08-9	Benzo(k)fluoranthene	SIM 8270C	0.01	0.005	**0.29**	0.01	0.005	**0.0038**	0.005	0.00062	**1.50**	0.005	0.00062	**0.0272**
	218-01-9	Chrysene	SIM 8270C	0.01	0.005	**2.9**	0.01	0.005	**0.0038**	0.005	0.00037	**15**	0.005	0.00037	**0.02683**
	53-70-3	Dibenzo(a,h)anthracene	SIM 8270C	0.01	0.005	**0.0029**	0.01	0.005	**0.0038**	0.005	0.00061	**0.02**	0.005	0.00061	**0.00622**
	193-39-5	Indeno(1,2,3-cd)pyrene	SIM 8270C	0.01	0.005	**0.029**	0.01	0.005	**0.0038**	0.005	0.00058	**0.15**	0.005	0.00058	**0.017**
Non-Carcinogen	83-32-9	Acenaphthene	SIM 8270C	0.1	0.01	**626**	0.1	0.01	**0.67**	0.005	0.00063	**52.3**	0.005	0.00063	**0.0067**
	208-96-8	Acenaphthylene	SIM 8270C	0.1	0.011	**626**	0.1	0.011	**NSA**	0.005	0.00057	**78**	0.005	0.00057	**0.00587**
	120-12-7	Anthracene	SIM 8270C	0.1	0.008	**3129**	0.1	0.008	**8.3**	0.005	0.00032	**1,040**	0.005	0.00032	**0.01**
	206-44-0	Fluoranthene	SIM 8270C	0.1	0.016	**417**	0.01	0.016	**0.13**	0.005	0.0004	**364**	0.005	0.0004	**0.03146**
	86-73-7	Fluorene	SIM 8270C	0.1	0.012	**417**	0.1	0.012	**1.1**	0.005	0.00059	**54.8**	0.005	0.00059	**0.01**
	90-12-0	1-Methylnaphthalene	SIM 8270C	0.1	0.012	**0.14**	0.1	0.012	**NSA**	0.005	0.0011	**22.0**	0.005	0.0011	**NSA**
	91-57-6	2-Methylnaphthalene	SIM 8270C	0.13	0.03	**313**	0.13	0.03	**NSA**	0.005	0.0018	**310.0**	0.005	0.0018	**NSA**
	91-20-3	Naphthalene	SIM 8270C	0.1	0.036	**2**	0.01	0.036	**NSA**	0.005	0.002	**1.14**	0.005	0.002	**0.01465**
	85-01-8	Phenanthrene	SIM 8270C	0.1	0.011	**150**	0.1	0.011	**NSA**	0.005	0.00045	**79**	0.005	0.00045	**0.01873**
	129-00-0	Pyrene	SIM 8270C	0.1	0.017	**313**	0.1	0.017	**0.83**	0.005	0.00031	**359**	0.005	0.00031	**0.04427**
	191-24-2	Benzo(g,h,i)perylene	SIM 8270C	0.1	0.02	**313**	0.1	0.02	**NSA**	0.005	0.00054	**1,178**	0.005	0.00054	**0.17**
Petroleum	-	Diesel Range Organicsa[a]	NWTPH-Dx	125	73	**NSA**	125	73	**NSA**	25	5.7	**NSA**	25	5.7	**NSA**
Petroleum	-	Heavy Oils	NWTPH-Dx	250	48	**NSA**	250	48	**NSA**	50	9.1	**NSA**	50	9.1	**NSA**
Petroleum	-	Mineral Oil	NWTPH-Dx	250	48	**NSA**	250	48	**NSA**	50	9.1	**NSA**	50.00	9.10	**NSA**

Notes:

a - Analyte list is from Multi-Media, Multi-Concentration Organic Analytical Statement of Work (OLM04.3) characterization, using the indicated PQLs.

b - SW846 analytical method.

c - Practical Quantitation Limit (PQL) or Minimum Detection Limit (MDL) , established by laboratory.

d - See Attachment 1 of the QAPP for a summary of regulatory screening criteria. Screening criteria includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards

EPA Removal Action Levels (September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

e - Surface water criteria assumes a hardness at 100 mg/L

Standard PQL or MDL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.

IDTL - Idaho Default Target Levels.

NA - Not applicable.

NSA - No Standard Available.

Potlatch Corporation / Avery Landing
PCB
Screening Levels

				GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
Type	Analytes	CAS #	Method[a]	Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c,d]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**
				ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	**mg/Kg**
PCBs	1016	12674-11-2	8082	0.05	0.03	**0.5**	0.05	0.03	**0.000064**	0.01	0.0032	**3.90**	0.01	0.0032	**0.026[e]**
PCBs	1221	11104-28-2	8082	0.05	0.03	**0.0068**	0.05	0.03	**0.000064**	0.01	0.008	**0.17**	0.01	0.008	**0.026[e]**
PCBs	1232	11141-16-5	8082	0.05	0.03	**0.0068**	0.05	0.03	**0.000064**	0.01	0.007	**0.17**	0.01	0.007	**0.026[e]**
PCBs	1242	53469-21-9	8082	0.05	0.03	**0.028**	0.05	0.03	**0.000064**	0.01	0.0021	**0.22**	0.01	0.0021	**0.026[e]**
PCBs	1248	12672-29-6	8082	0.05	0.03	**0.028**	0.05	0.03	**0.000064**	0.01	0.0013	**0.22**	0.01	0.0013	**0.026[e]**
PCBs	1254	11097-69-1	8082	0.05	0.03	**0.034**	0.05	0.03	**0.000064**	0.01	0.0021	**0.22**	0.01	0.0021	**0.026[e]**
PCBs	1260	11096-82-5	8082	0.05	0.03	**0.028**	0.05	0.03	**0.000064**	0.01	0.003	**0.22**	0.01	0.003	**0.026[e]**

Notes:

NSA - No standard available.

IDTL - Idaho Default Target Level

Standard PQL or MDL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.

a - SW846 analytical methods.

b - PQL / MDL; Practical Quantitation Limit and Method Detection Limit respectively, established by the laboratory.

d - See Attachment 1 of the QAPP for a summary of regulatory screening criteria. Screening criteria includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards

EPA Removal Action Levels (September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

d - Surface water criteria assumes a hardness at 100 mg/L

e - Concentration is for total PCBs

TABLE QAPP-8

Potlatch Corporation / Avery Landing
Target Compound List Volatile Organic Compounds
Screening Levels

				GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
Type	Analytes	CAS #	Method[a]	Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c,d]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**
				ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	**mg/Kg**
VOC	1,1,1,2-Tetrachloroethane	630-20-6	8260B	0.1	0.013	**0.52**	0.1	0.013	**NSA**	0.04	0.0048	**0.04**	0.04	0.0048	**NSA**
VOC	1,1,1-Trichloroethane	71-55-6	8260B	0.1	0.01	**200**	0.1	0.01	**NSA**	0.04	0.005	**2**	0.04	0.005	**0.03**
VOC	1,1,2,2-Tetrachloroethane	79-34-5	8260B	0.1	0.024	**0.067**	0.1	0.024	**0.17**	0.01	0.0033	**0.009**	0.01	0.0033	**1.36**
VOC	1,1,2-Trichloroethane	79-00-5	8260B	0.1	0.019	**0.24**	0.1	0.019	**0.59**	0.012	0.0018	**0.014**	0.012	0.0018	**1.24**
VOC	1,1-Dichloroethane	75-34-3	8260B	0.1	0.01	**2.4**	0.1	0.01	**NSA**	0.04	0.0038	**3.4**	0.04	0.0038	**NSA**
VOC	1,1-Dichloroethene	75-35-4	8260B	0.1	0.027	**7**	0.1	0.027	**330**	0.02	0.005	**0.039**	0.02	0.005	**0.03**
VOC	1,1-Dichloropropene	563-58-6	8260B	0.1	0.021	**NSA**	0.1	0.021	**NSA**	0.04	0.0018	**NSA**	0.04	0.0018	**NSA**
VOC	1,2,3-Trichlorobenzene	87-61-6	8260B	0.4	0.071	**NSA**	0.4	0.071	**NSA**	0.04	0.005	**NSA**	0.04	0.005	**0.86**
VOC	1,2,3-Trichloropropane	96-18-4	8260B	0.2	0.036	**0.0096**	0.2	0.036	**NSA**	0.04	0.0116	**0.00025**	0.04	0.0116	**NSA**
VOC	1,2,4-Trichlorobenzene	120-82-1	8260B	0.2	0.065	**8.2**	0.2	0.065	**NSA**	0.04	0.005	**0.69**	0.04	0.005	**2.1**
VOC	1,2,4-Trimethylbenzene	95-63-6	8260B	0.1	0.03	**15**	0.1	0.03	**NSA**	0.04	0.0021	**0.19**	0.04	0.0021	**NSA**
VOC	1,2-Dibromo-3-Chloropropane	96-12-8	8260B	0.2	0.041	**0.0003**	0.2	0.041	**NSA**	0.2	0.066	**0.001**	0.2	0.066	**NSA**
VOC	1,2-Dichlorobenzene	95-50-1	8260B	0.2	0.041	**370**	0.2	0.041	**NSA**	0.04	0.0026	**5.25**	0.04	0.0026	**0.017**
VOC	1,2-Dichloroethane	107-06-2	8260B	0.1	0.015	**0.15**	0.1	0.015	**0.38**	0.04	0.0022	**0.008**	0.04	0.0022	**NSA**
VOC	1,2-Dichloropropane	78-87-5	8260B	0.1	0.025	**0.39**	0.1	0.025	**0.5**	0.012	0.0039	**0.009**	0.012	0.0039	**NSA**
VOC	1,3,5-Trimethylbenzene	108-67-8	8260B	0.1	0.025	**12**	0.1	0.025	**NSA**	0.04	0.0042	**0.145**	0.04	0.0042	**NSA**
VOC	1,3-Dichlorobenzene	541-73-1	8260B	0.2	0.044	**9.39**	0.2	0.044	**NSA**	0.04	0.005	**0.229**	0.04	0.005	**4.43**
VOC	1,3-Dichloropropane	142-28-9	8260B	0.1	0.017	**730**	0.1	0.017	**NSA**	0.04	0.005	**1,600**	0.04	0.005	**NSA**
VOC	1,4-Dichlorobenzene	106-46-7	8260B	0.2	0.0152	**0.43**	0.2	0.0152	**NSA**	0.04	0.005	**0.076**	0.04	0.005	**0.599**
VOC	2,2-Dichloropropane	594-20-7	8260B	0.1	0.013	**NSA**	0.1	0.013	**NSA**	0.04	0.0037	**NSA**	0.04	0.0037	**NSA**
VOC	2-Chlorotoluene	95-49-8	8260B	0.1	0.026	**209**	0.1	0.026	**NSA**	0.04	0.0054	**1.56**	0.04	0.0054	**NSA**
VOC	4-Chlorotoluene	106-43-4	8260B	0.2	0.042	**2,600**	0.2	0.042	**NSA**	0.04	0.013	**5,500**	0.04	0.013	**NSA**
VOC	4-Isopropyltoluene	99-87-6	8260B	0.2	0.039	**NSA**	0.2	0.039	**NSA**	0.04	0.0028	**NSA**	0.04	0.0028	**NSA**
VOC	Benzene	71-43-2	8260B	0.1	0.01	**0.41**	0.1	0.01	**NSA**	0.016	0.0025	**0.018**	0.016	0.0025	**NSA**
VOC	Bromobenzene	108-86-1	8260B	0.1	0.032	**20**	0.1	0.032	**NSA**	0.04	0.0027	**94**	0.04	0.0027	**NSA**
VOC	Bromoform	75-25-2	8260B	0.1	0.013	**7.07**	0.1	0.013	**4.3**	0.04	0.011	**0.029**	0.04	0.011	**0.65**
VOC	Bromomethane	74-83-9	8260B	0.1	0.025	**8.7**	0.1	0.025	**NSA**	0.14	0.025	**0.05**	0.14	0.025	**NSA**
VOC	Carbon tetrachloride	56-23-5	8260B	0.1	0.019	**0.2**	0.1	0.019	**0.23**	0.02	0.0037	**0.01**	0.02	0.0037	**0.064**
VOC	Chlorobenzene	108-90-7	8260B	0.1	0.014	**91**	0.1	0.014	**130**	0.04	0.0023	**0.62**	0.04	0.0023	**0.0084**
VOC	Chlorobromomethane	74-97-5	8260B	0.1	0.012	**NSA**	0.1	0.012	**0.4**	0.04	0.012	**NSA**	0.04	0.012	**NSA**
VOC	Chlorodibromomethane	124-48-1	8260B	0.1	0.014	**0.15**	0.1	0.014	**0.4**	0.04	0.008	**0.7**	0.04	0.008	**NSA**
VOC	Chloroethane	75-00-3	8260B	0.2	0.052	**19**	0.2	0.052	**NSA**	0.4	0.023	**0.053**	0.4	0.023	**NSA**
VOC	Chloroform	67-66-3	8260B	0.1	0.026	**0.19**	0.1	0.026	**5.7**	0.04	0.0021	**0.006**	0.04	0.0021	**NSA**
VOC	Chloromethane	74-87-3	8260B	0.1	0.031	**4.3**	0.1	0.031	**NSA**	0.4	0.06	**0.023**	0.4	0.06	**NSA**
VOC	cis-1,2-Dichloroethene	156-59-2	8260B	0.1	0.011	**70**	0.1	0.011	**NSA**	0.04	0.0024	**0.19**	0.04	0.0024	**NSA**
VOC	cis-1,3-Dichloropropene	10061-01-5	8260B	0.1	0.012	**0.56**	0.1	0.012	**NSA**	0.016	0.0024	**0.002**	0.016	0.0024	**NSA**
VOC	Dibromomethane	74-95-3	8260B	0.1	0.011	**370**	0.1	0.011	**NSA**	0.04	0.004	**780**	0.04	0.004	**NSA**
VOC	Dichlorobromomethane	75-27-4	8260B	0.1	0.009	**0.12**	0.1	0.009	**0.55**	0.04	0.003	**0.0027**	0.04	0.003	**NSA**
VOC	Dichlorodifluoromethane	75-71-8	8260B	0.4	0.07	**195**	0.4	0.07	**NSA**	0.04	0.008	**2.96**	0.04	0.008	**NSA**
VOC	Ethylbenzene	100-41-4	8260B	0.1	0.027	**1.5**	0.1	0.027	**530**	0.04	0.0037	**5.7**	0.04	0.0037	**1.1**
VOC	Ethylene Dibromide	106-93-4	8260B	0.2	0.0178	**0.0065**	0.2	0.0178	**NSA**	0.04	0.0032	**0.0001**	0.04	0.0032	**NSA**

TABLE QAPP-8

Potlatch Corporation / Avery Landing
Target Compound List Volatile Organic Compounds
Screening Levels

Type	Analytes	CAS #	Method[a]	GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
				Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Water PQL[b]	Laboratory Water MDL[b]	**Lowest Regulatory Screening Criteria[c,d]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	**Lowest Regulatory Screening Criteria[c]**
				ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	**mg/Kg**
VOC	Hexachlorobutadiene	87-68-3	8260B	0.2	0.059	**0.72**	0.2	0.059	**NSA**	0.04	0.0056	**0.038**	0.04	0.0056	**NSA**
VOC	Isopropylbenzene	98-82-8	8260B	0.1	0.016	**680**	0.1	0.016	**NSA**	0.04	0.0018	**3.46**	0.04	0.0018	**0.086**
VOC	Methylene Chloride	75-09-2	8260B	0.1	0.007	**4.8**	0.1	0.007	**4.6**	0.04	0.0038	**0.017**	0.04	0.0038	**NSA**
VOC	m-Xylene & p-Xylene	136777-61-2	8260B	0.2	0.025	**200**	0.2	0.025	**NSA**	0.04	0.0078	**1.67**	0.04	0.0078	**0.025**
VOC	Naphthalene	91-20-3	8260B	0.4	0.078	**0.14**	0.4	0.078	**NSA**	0.04	0.006	**1.14**	0.04	0.006	**0.176**
VOC	n-Butylbenzene	104-51-8	8260B	0.1	0.026	**NSA**	0.1	0.026	**NSA**	0.04	0.0073	**NSA**	0.04	0.0073	**NSA**
VOC	N-Propylbenzene	103-65-1	8260B	0.1	0.023	**NSA**	0.1	0.023	**NSA**	0.04	0.0028	**NSA**	0.04	0.0028	**NSA**
VOC	o-Xylene	95-47-6	8260B	0.1	0.012	**1,400**	0.1	0.012	**NSA**	0.04	0.0023	**5,300**	0.04	0.0023	**NSA**
VOC	sec-Butylbenzene	135-98-8	8260B	0.1	0.024	**104**	0.1	0.024	**NSA**	0.04	0.005	**1.17**	0.04	0.005	**NSA**
VOC	Styrene	100-42-5	8260B	0.1	0.012	**100**	0.1	0.012	**NSA**	0.04	0.0038	**1.83**	0.04	0.0038	**0.56**
VOC	tert-Butylbenzene	98-06-6	8260B	0.1	0.018	**104**	0.1	0.018	**NSA**	0.04	0.0032	**0.85**	0.04	0.0032	**NSA**
VOC	Tetrachloroethene	127-18-4	8260B	0.1	0.017	**0.11**	0.1	0.017	**0.69**	0.02	0.0021	**0.029**	0.02	0.0021	**0.47**
VOC	Toluene	108-88-3	8260B	0.1	0.011	**1,000**	0.1	0.011	**1,300**	0.04	0.0024	**4.89**	0.04	0.0024	**NSA**
VOC	trans-1,2-Dichloroethene	156-60-5	8260B	0.1	0.017	**100**	0.1	0.017	**140**	0.04	0.0035	**0.36**	0.04	0.0035	**1.05**
VOC	trans-1,3-Dichloropropene	10061-02-6	8260B	0.1	0.024	**0.56**	0.1	0.024	**NSA**	0.016	0.004	**0.002**	0.016	0.004	**NSA**
VOC	Trichloroethene	79-01-6	8260B	0.1	0.018	**1.7**	0.1	0.018	**2.5**	0.016	0.0034	**0.0029**	0.016	0.0034	**0.097**
VOC	Trichlorofluoromethane	75-69-4	8260B	0.1	0.019	**1,300**	0.1	0.019	**NSA**	0.04	0.005	**10.4**	0.04	0.005	**NSA**
VOC	Vinyl chloride	75-01-4	8260B	0.02	0.013	**0.016**	0.02	0.013	**0.025**	0.008	0.0017	**0.01**	0.008	0.0017	**0.031**

Notes:

NSA - No standard available.

IDTL - Idaho Default Target Level

Standard PQL or MDL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.

a - SW846 analytical methods.

b - PQL / MDL; Practical Quantitation Limit and Method Detection Limit respectively, established by the laboratory.

c - See Attachment 1 of the QAPP for a summary of regulatory screening criteria. Screening criteria includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards

EPA Removal Action Levels (September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

d - Surface water criteria assumes a hardness at 100 mg/L

TABLE QAPP-9

Potlatch Corporation / Avery Landing
Target Compound List Semi-Volatile Organic Compounds
Screening Levels

				GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
Type	Analytes	CAS #	Method[a]	Laboratory Water PQL[b]	Laboratory Water MDL[b]	Lowest Regulatory Screening Criteria[c]	Laboratory Water PQL[b]	Laboratory Water MDL[b]	Lowest Regulatory Screening Criteria[c,d]	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	Lowest Regulatory Screening Criteria[c]	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	Lowest Regulatory Screening Criteria[c]
				ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
SVOC	1,2,4-Trichlorobenzene	120-82-1	8270C	0.4	0.0136	**8.2**	0.4	0.0136	**35**	0.05	0.012	**0.69**	0.05	0.012	**2.1**
SVOC	1,2-Dichlorobenzene	95-50-1	8270C	0.4	0.022	**370**	0.4	0.022	**420**	0.05	0.0064	**5.25**	0.05	0.0064	**0.0165**
SVOC	1,3-Dichlorobenzene	541-73-1	8270C	0.4	0.0162	**9.39**	0.4	0.0162	**320**	0.05	0.0072	**0.23**	0.05	0.0072	**4.43**
SVOC	1,4-Dichlorobenzene	106-46-7	8270C	0.4	0.0126	**0.43**	0.4	0.0126	**63**	0.05	0.0032	**0.076**	0.05	0.0032	**0.599**
SVOC	1-Methylnaphthalene	90-12-0	8270C	0.06	0.028	**2.3**	0.06	0.028	**NSA**	0.03	0.0018	**22**	0.03	0.0018	**NSA**
SVOC	2,2'-oxybis[1-chloropropane]	108-60-1	8270C	0.4	0.046	**0.32**	0.4	0.046	**NSA**	0.15	0.0067	**3.5**	0.15	0.0067	**NSA**
SVOC	2,4,5-Trichlorophenol	95-95-4	8270C	0.4	0.0196	**1,043**	0.4	0.0196	**NSA**	0.1	0.0043	**7.4**	0.1	0.0043	**NSA**
SVOC	2,4,6-Trichlorophenol	88-06-2	8270C	0.6	0.028	**1.04**	0.6	0.028	**1.4**	0.15	0.004	**0.004**	0.15	0.004	**0.213**
SVOC	2,4-Dichlorophenol	120-83-2	8270C	0.4	0.018	**31.29**	0.4	0.018	**77**	0.1	0.003	**0.098**	0.1	0.003	**0.177**
SVOC	2,4-Dimethylphenol	105-67-9	8270C	1	0.24	**209**	1	0.24	**380**	0.1	0.0021	**0.82**	0.1	0.0021	**0.029**
SVOC	2,4-Dinitrophenol	51-28-5	8270C	5	0.5	**20.86**	5	0.5	**69**	1	0.014	**0.038**	1	0.014	**NSA**
SVOC	2,4-Dinitrotoluene	121-14-2	8270C	0.4	0.0188	**0.08**	0.4	0.0188	**0.11**	0.1	0.0025	**0.00029**	0.1	0.0025	**0.0416**
SVOC	2,6-Dinitrotoluene	606-20-2	8270C	0.4	0.036	**0.08**	0.4	0.036	**NSA**	0.1	0.0041	**0.00021**	0.1	0.0041	**NSA**
SVOC	2-Chloronaphthalene	91-58-7	8270C	0.06	0.0058	**834**	0.06	0.0058	**1,000**	0.02	0.0018	**128**	0.02	0.0018	**NSA**
SVOC	2-Chlorophenol	95-57-8	8270C	0.4	0.026	**52.14**	0.4	0.026	**81**	0.1	0.0074	**0.36**	0.1	0.0074	**NSA**
SVOC	2-Methylnaphthalene	91-57-6	8270C	0.2	0.0196	**150**	0.2	0.0196	**NSA**	0.02	0.0023	**310**	0.02	0.0023	**0.0202**
SVOC	2-Methylphenol	95-48-7	8270C	0.4	0.028	**521**	0.4	0.028	**NSA**	0.1	0.0071	**1.8**	0.1	0.0071	**NSA**
SVOC	2-Nitroaniline	88-74-4	8270C	0.4	0.026	**31.3**	0.4	0.026	**NSA**	0.1	0.0042	**0.073**	0.1	0.0042	**NSA**
SVOC	2-Nitrophenol	88-75-5	8270C	0.4	0.028	**NSA**	0.4	0.028	**NSA**	0.1	0.0043	**NSA**	0.1	0.0043	**NSA**
SVOC	3 & 4 Methylphenol	15831-10-4	8270C	0.8	0.02	**NSA**	0.8	0.02	**NSA**	0.2	0.0056	**NSA**	0.2	0.0056	**NSA**
SVOC	3,3'-Dichlorobenzidine	91-94-1	8270C	2	0.064	**0.12**	2	0.064	**0.021**	0.2	0.0079	**0.0018**	0.2	0.0079	**0.127**
SVOC	3-Nitroaniline	99-09-2	8270C	0.4	0.114	**1.47**	0.4	0.114	**NSA**	0.1	0.0058	**0.0032**	0.1	0.0058	**NSA**
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	8270C	4	0.22	**3.70**	4	0.22	**13**	1	0.018	**6.1**	1	0.018	**NSA**
SVOC	4-Bromophenyl phenyl ether	101-55-3	8270C	0.4	0.022	**NSA**	0.4	0.022	**NSA**	0.1	0.0033	**NSA**	0.1	0.0033	**1.23**
SVOC	4-Chloro-3-methylphenol	59-50-7	8270C	0.4	0.028	**NSA**	0.4	0.028	**NSA**	0.1	0.0071	**NSA**	0.1	0.0071	**NSA**
SVOC	4-Chloroaniline	106-47-8	8270C	0.4	0.0188	**0.34**	0.4	0.0188	**NSA**	0.1	0.011	**0.13**	0.1	0.011	**NSA**
SVOC	4-Chlorophenyl phenyl ether	7005-72-3	8270C	0.4	0.0174	**NSA**	0.4	0.0174	**NSA**	0.1	0.0057	**NSA**	0.1	0.0057	**NSA**
SVOC	4-Nitroaniline	100-01-6	8270C	0.6	0.036	**1.47**	0.6	0.036	**NSA**	0.1	0.014	**0.003**	0.1	0.014	**NSA**
SVOC	4-Nitrophenol	100-02-7	8270C	2	0.98	**83.43**	2	0.98	**NSA**	1	0.17	**0.23**	1	0.17	**NSA**
SVOC	Acenaphthene	83-32-9	8270C	0.1	0.0076	**626**	0.1	0.0076	**670**	0.02	0.0016	**52**	0.02	0.0016	**0.0067**
SVOC	Acenaphthylene	208-96-8	8270C	0.08	0.0074	**626**	0.08	0.0074	**NSA**	0.02	0.0016	**78**	0.02	0.0016	**0.0059**
SVOC	Anthracene	120-12-7	8270C	0.04	0.0082	**3,129**	0.04	0.0082	**8,300**	0.02	0.0014	**1,040**	0.02	0.0014	**0.0572**
SVOC	Benzo[a]anthracene	56-55-3	8270C	0.06	0.0134	**0.029**	0.06	0.0134	**0.0038**	0.025	0.0017	**0.15**	0.025	0.0017	**0.108**
SVOC	Benzo[a]pyrene	50-32-8	8270C	0.04	0.0144	**0.0029**	0.04	0.0144	**0.0038**	0.03	0.0021	**0.015**	0.03	0.0021	**0.15**
SVOC	Benzo[b]fluoranthene	205-99-2	8270C	0.08	0.011	**0.029**	0.08	0.011	**0.0038**	0.02	0.0041	**0.15**	0.02	0.0041	**0.0272**
SVOC	Benzo[g,h,i]perylene	191-24-2	8270C	0.06	0.0116	**313**	0.06	0.0116	**NSA**	0.025	0.0015	**1,178**	0.025	0.0015	**0.17**
SVOC	Benzo[k]fluoranthene	207-08-9	8270C	0.06	0.0088	**0.29**	0.06	0.0088	**0.0038**	0.025	0.0013	**1.50**	0.025	0.0013	**0.24**
SVOC	Benzoic acid	65-85-0	8270C	2	0.42	**41,714**	2	0.42	**NSA**	2.5	0.65	**77**	2.5	0.65	**0.65**
SVOC	Benzyl alcohol	100-51-6	8270C	0.4	0.03	**3,129**	0.4	0.03	**NSA**	0.1	0.0096	**6.43**	0.1	0.0096	**NSA**
SVOC	Bis(2-chloroethoxy)methane	111-91-1	8270C	0.4	0.028	**110**	0.4	0.028	**NSA**	0.1	0.003	**180**	0.1	0.003	**NSA**
SVOC	Bis(2-chloroethyl)ether	111-44-4	8270C	0.4	0.02	**0.012**	0.4	0.02	**0.03**	0.1	0.0099	**0.0001**	0.1	0.0099	**NSA**
SVOC	Bis(2-ethylhexyl) phthalate	117-81-7	8270C	3	1.18	**4.8**	3	1.18	**1.2**	1.5	0.042	**11.8**	1.5	0.042	**0.18**

TABLE QAPP-9

Potlatch Corporation / Avery Landing
Target Compound List Semi-Volatile Organic Compounds
Screening Levels

Type	Analytes	CAS #	Method[a]	GROUNDWATER			SURFACE WATER			SOIL			SEDIMENT		
				Laboratory Water PQL[b]	Laboratory Water MDL[b]	Lowest Regulatory Screening Criteria[c]	Laboratory Water PQL[b]	Laboratory Water MDL[b]	Lowest Regulatory Screening Criteria[c,d]	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	Lowest Regulatory Screening Criteria[c]	Laboratory Soil PQL[b]	Laboratory Soil MDL[b]	Lowest Regulatory Screening Criteria[c]
				ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
SVOC	Butyl benzyl phthalate	85-68-7	8270C	0.6	0.192	**35**	0.6	0.192	**1,500**	0.1	0.031	**260**	0.1	0.031	**10.9**
SVOC	Carbazole	86-74-8	8270C	0.4	0.026	**NSA**	0.4	0.026	**NSA**	0.15	0.0043	**NSA**	0.15	0.0043	**NSA**
SVOC	Chrysene	218-01-9	8270C	0.04	0.013	**2.9**	0.04	0.013	**0.0038**	0.025	0.0014	**15**	0.025	0.0014	**0.166**
SVOC	Dibenz(a,h)anthracene	53-70-3	8270C	0.06	0.0104	**0.0029**	0.06	0.0104	**0.0038**	0.04	0.0022	**0.015**	0.04	0.0022	**0.033**
SVOC	Dibenzofuran	132-64-9	8270C	0.4	0.019	**41.7**	0.4	0.019	**NSA**	0.1	0.0015	**6.1**	0.1	0.0015	**0.415**
SVOC	Diethyl phthalate	84-66-2	8270C	0.4	0.0142	**8,343**	0.4	0.0142	**17,000**	0.1	0.015	**27.5**	0.1	0.015	**0.603**
SVOC	Dimethyl phthalate	131-11-3	8270C	0.4	0.0156	**104,286**	0.4	0.0156	**270,000**	0.1	0.0042	**271**	0.1	0.0042	**NSA**
SVOC	Di-n-butyl phthalate	84-74-2	8270C	0.4	0.106	**1,043**	0.4	0.106	**2,000**	0.2	0.026	**31.0**	0.2	0.026	**6.47**
SVOC	Di-n-octyl phthalate	117-84-0	8270C	0.4	0.186	**417**	0.4	0.186	**NSA**	0.2	0.0013	**1,829**	0.2	0.0013	**NSA**
SVOC	Fluoranthene	206-44-0	8270C	0.05	0.0128	**417**	0.05	0.0128	**130**	0.02	0.0012	**364**	0.02	0.0012	**0.423**
SVOC	Fluorene	86-73-7	8270C	0.06	0.0074	**417**	0.06	0.0074	**1,100**	0.02	0.0012	**54.8**	0.02	0.0012	**0.0774**
SVOC	Hexachlorobenzene	118-74-1	8270C	0.4	0.0158	**0.04**	0.4	0.0158	**0.0003**	0.05	0.0038	**0.043**	0.05	0.0038	**0.02**
SVOC	Hexachlorobutadiene	87-68-3	8270C	0.6	0.038	**0.72**	0.6	0.038	**0.44**	0.05	0.0091	**0.038**	0.05	0.0091	**NSA**
SVOC	Hexachlorocyclopentadiene	77-47-4	8270C	2	0.052	**7.01**	2	0.052	**40**	0.1	0.0026	**0.012**	0.1	0.0026	**3**
SVOC	Hexachloroethane	67-72-1	8270C	0.6	0.032	**3.99**	0.6	0.032	**1.4**	0.1	0.011	**0.14**	0.1	0.011	**1.027**
SVOC	Indeno[1,2,3-cd]pyrene	193-39-5	8270C	0.06	0.0114	**0.029**	0.06	0.0114	**0.0038**	0.04	0.0042	**0.15**	0.04	0.0042	**0.017**
SVOC	Isophorone	78-59-1	8270C	0.4	0.032	**58.80**	0.4	0.032	**35**	0.1	0.0041	**0.14**	0.1	0.0041	**NSA**
SVOC	Naphthalene	91-20-3	8270C	0.4	0.0148	**0.14**	0.4	0.0148	**NSA**	0.02	0.0022	**1.14**	0.02	0.0022	**0.176**
SVOC	Nitrobenzene	98-95-3	8270C	0.4	0.056	**0.12**	0.4	0.056	**17**	0.1	0.029	**0.02**	0.1	0.029	**NSA**
SVOC	N-Nitrosodi-n-propylamine	621-64-7	8270C	0.4	0.058	**0.00798**	0.4	0.058	**0.00069**	0.1	0.0097	**0.000018**	0.1	0.0097	**NSA**
SVOC	N-Nitrosodiphenylamine	86-30-6	8270C	0.4	0.024	**11.40**	0.4	0.024	**3.3**	0.05	0.0022	**0.088**	0.05	0.0022	**2.68**
SVOC	Pentachlorophenol	87-86-5	8270C	0.7	0.022	**0.56**	0.7	0.022	**0.27**	0.1	0.012	**0.009**	0.1	0.012	**0.504**
SVOC	Phenanthrene	85-01-8	8270C	0.08	0.0092	**313**	0.08	0.0092	**NSA**	0.02	0.0021	**79**	0.02	0.0021	**0.204**
SVOC	Phenol	108-95-2	8270C	0.6	0.04	**3,129**	0.6	0.04	**21,000**	0.1	0.0074	**7.4**	0.1	0.0074	**0.42**
SVOC	Pyrene	129-00-0	8270C	0.06	0.0106	**313**	0.06	0.0106	**830**	0.02	0.0014	**359**	0.02	0.0014	**0.195**

Notes: NSA - No standard available.

IDTL - Idaho Default Target Level

Standard PQL or MDL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.

a - SW846 analytical methods.

b - PQL / MDL; Practical Quantitation Limit and Method Detection Limit respectively, established by the laboratory.

c - See Attachment 1 of the QAPP for a summary of regulatory screening criteria. Screening criteria includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards

EPA Removal Action Levels (September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

d - Surface water criteria assumes a hardness at 100 mg/L

FIGURE

GOLDER PROJECT ORGANIZATION CHART

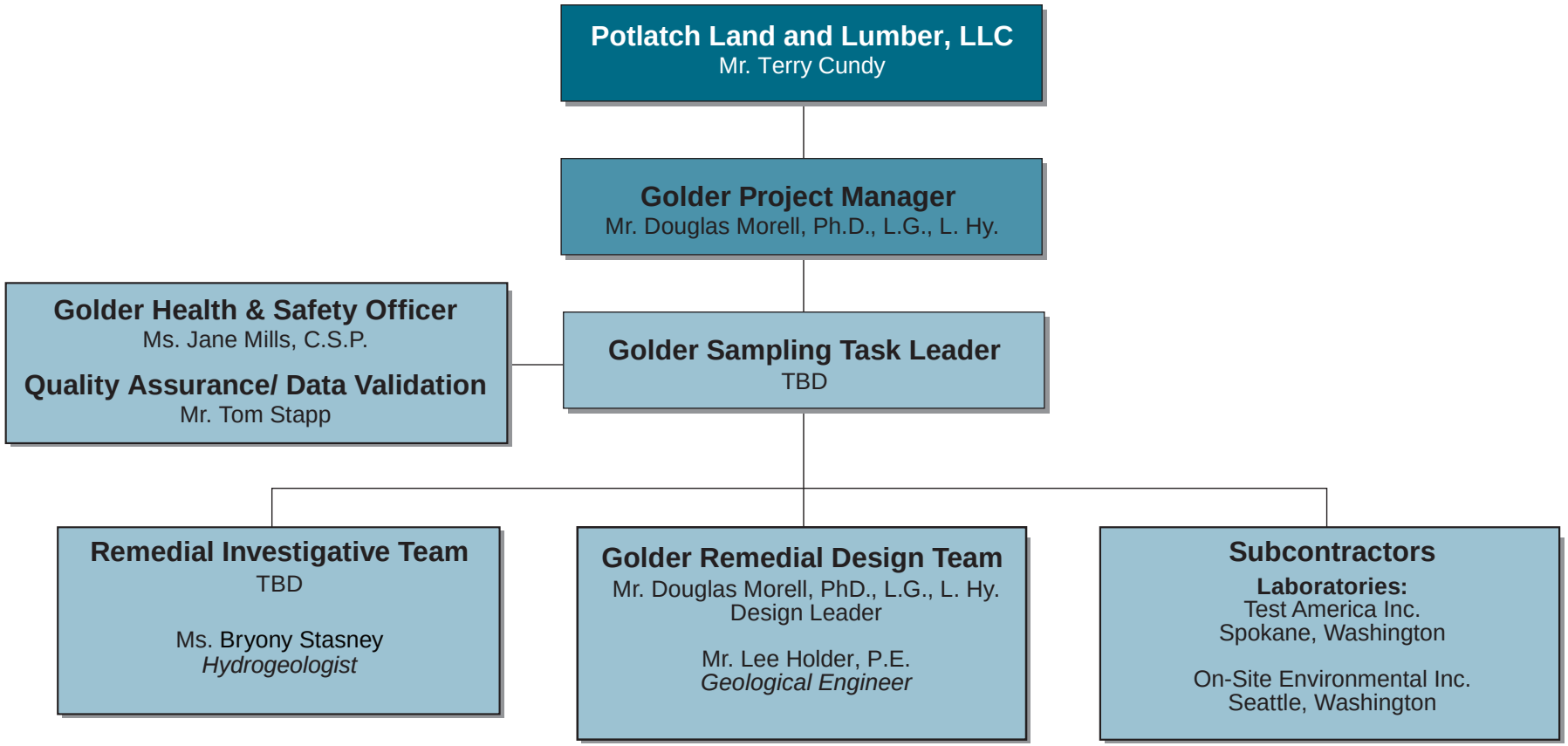


FIGURE **QAPP1-1**
GOLDER PROJECT ORGANIZATION
EE/CA WORK PLAN AVERY LANDING SITE /WA

ATTACHMENT 1

REGULATORY SCREENING LEVEL CRITERIA

Regulatory Screening Level Criteria
Target Analyte List Metals

				GROUNDWATER					SURFACE WATER			SOIL				SEDIMENT			
Type	Analytes [a]	CAS #	Method[b]	IDTL for Groundwater	National Primary Drinking Water Standards[f]	EPA Removal Action Levels[n]	EPA Regional Screening Levels	**Most Protective Cleanup Level for Surface Water**	Idaho DEQ Aquatic Life criteria[h,i]	Idaho DEQ Human Health Quality Criteria[h,i] ALL WATERS	Most Protective Cleanup Level for Surface Water	IDTL for Soil	EPA Removal Action Levels[i]	EPA Regional Screening Levels[i]	Most Protective Cleanup Level for Soil	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines	EPA Freshwater Sed. Screening Benchmarks	**Most Protective Cleanup Level for Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	ug/L	ug/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
Metals	Aluminum	7429-90-5	6010/6020	NSA	200 [g]	86,400	37,000	**200**	NSA	NSA	**NSA**	NSA	791,000	77,000	**77000**	25,500	NSA	NSA	**25,500**
Metals	Arsenic	7440-38-2	6010/6020	10	10	10	0.045	**0.045**	150	50	**50**	0.39	39	0.39	**0.39**	5.9	9.79	9.8	**5.9**
Metals	Antimony	7440-36-0	6010/6020	6	6	6	15	**6**	NSA	5.6	**5.6**	4.77	329	31	**4.77**	NSA	NSA	2	**2**
Metals	Barium	7440-39-3	6010/6020	2000	2,000	2,000	7,300	**2,000**	NSA	NSA	**NSA**	896	164,000	15,000	**896**	NSA	NSA	NSA	**NSA**
Metals	Beryllium	7440-41-7	6010/6020	4.0	4	4	73	**4**	NSA	NSA	**NSA**	1.63	1,610	160	**1.63**	NSA	NSA	NSA	**NSA**
Metals	Calcium	7440-70-2	6010/6020	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Metals	Cadmium	7440-43-9	6010/6020	5	5	5	18	**5**	0.6	NSA	**0.6**	1.35	729	70	**1.35**	0.583	0.99	0.99	**0.583**
Metals	Chromium	7440-47-3	6010/6020	100	100[e]	130,000[d]	55,000[d]	**100**	74	NSA	**74**	2134.77	27,600[e]	280[e]	**2135**	26	43.4	43.4	**26**
Metals	Cobalt	7440-48-4	6010/6020	NSA	NSA	26	11	**11**	NSA	NSA	**NSA**	NSA	244	23	**23**	50	NSA	50	**50**
Metals	Copper	7440-50-8	6010/6020	1,300	1,000	1,300	1,500	**1,000**	11	NSA	**11**	921.27	NSA	3,100	**921**	16	31.6	31.6	**16**
Metals	Iron	7439-89-6	6010/6020	3,100	300 [g]	60,500	26,000	**300**	NSA	NSA	**NSA**	5.76	575,000	55,000	**5.76**	20,000	NSA	20,000	**20,000**
Metals	Lead	7439-92-1	6010/6020	15	15	15	NSA	**15**	2.5	NSA	**2.5**	49.6	NSA	400	**49.62**	31	35.8	35.8	**31**
Metals	Magnesium	7439-95-4	6010/6020	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Metals	Manganese	7439-96-5	6010/6020	250.29	50	2,070	880	**50**	NSA	NSA	**NSA**	223	18,000	1,800	**223**	460	NSA	460	**460**
Metals	Mercury	7439-97-6	7470A / 7471B	2	2	2	1	**1**	NSA	NSA	**NSA**	0.0051	20	4.3	**0.0051**	0.174	0.18	0.18	**0.174**
Metals	Nickel	7440-02-0	6010/6020	208.57	NSA	1,730	730	**208.57**	52	610	**52**	59	16,400	1,500	**59**	16	22.7	22.7	**16**
Metals	Potassium	7440-09-7	6010/6020	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Metals	Selenium	7782-49-2	6010/6020	50	50	50	180	**50**	5.0	170	**5**	2.03	4,110	390	**2.03**	NSA	NSA	2	**2**
Metals	Silver	7440-22-4	6010/6020	52.14	100 [g]	432	180	**52.14**	NSA	NSA	**3.4**	0.19	4,110	390	**0.19**	0.5	NSA	1	**0.5**
Metals	Sodium	7440-23-5	6010/6020	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Metals	Thallium	7440-30-4	6010/6020	2	2	2	2	**2**	NSA	0.24	**0.24**	1.55	53	5.1	**1.55**	NSA	NSA	NSA	**NSA**
Metals	Vanadium	7440-62-2	6010/6020	NSA	NSA	436	180	**180**	NSA	NSA	**NSA**	NSA	4,140	2.4	**2.4**	NSA	NSA	NSA	**NSA**
Metals	Zinc	7440-66-6	6010/6020	3128.57	5,000 [g]	25,900	11,000	**3,129**	120	7400	**120**	886	246,000	23,000	**886**	98	121	121	**98**

Notes:

NA - Not applicable.

NSA - No standard available.

IDTL - Idaho Default Target Levels.

a - Target Analyte List Metals.

b - SW846 analytical method 6020 (ICP/MS).

c -Practical Quantitation Limit (PQL), Minimum Detection Limit (MDL) - established by the laboratory.

d - Chromium (III) value

e - Total Chromium value

f - Federal Water Quality Criteria, Primary Drinking Water Standards, Maximum Contaminant Levels (MCLs).

g - Federal Water Quality Criteria, Secondary Drinking Water Standards.

h - Surface water criteria assumes a hardness at 100 mg/L

i - Lowest value in table was used.

The screening criteria summarized above includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards

EPA Removal Action Levels (September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

Regulatory Screening Level Criteria
PAH and Petroleum

				GROUNDWATER					SURFACE WATER			SOIL				SEDIMENT			
Type	CAS #	Analytes[a]	Method[b]	EPA Removal Action Levels	EPA Regional Screening Levels - Tapwater	National Primary Drinking Water Standards	IDTL for Groundwater	**Most Protective Cleanup Level for Groundwater**	Idaho DEQ Human Health Quality Criteria - Domestic Water Supply[d,e]	Idaho DEQ Human Consumption of Aquatic Life[d,e]	**Most Protective Cleanup Level for Groundwater**	EPA Removal Action Levels[d]	IDTL for Soil	EPA Regional Screening Levels[d]	**Most Protective Cleanup Level for Soil**	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines	EPA Freshwater Sed. Screening Benchmarks	**Most Protective Cleanup Level for Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	mg/L	mg/L	**ug/L**	mg/Kg	mg/Kg	mg/kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
Carcinogen	56-55-3	Benzo(a)anthracene	SIM 8270C	1.79	0.029	NSA	0.0765	**0.029**	0.0038	0.018	**0.0038**	8.98	0.422	0.15	**0.15**	0.0157	0.108	0.108	**0.0157**
	50-32-8	Benzo(a)pyrene	SIM 8270C	0.20	0.0029	0.2000	0.2[c]	**0.0029**	0.0038	0.018	**0.0038**	1.48	0.042	0.015	**0.02**	0.0319	0.150	0.150	**0.0319**
	205-99-2	Benzo(b)fluoranthene	SIM 8270C	1.79	0.029	NSA	0.0765	**0.029**	0.0038	0.018	**0.0038**	8.98	0.422	0.15	**0.15**	NSA	NSA	0.0272	**0.0272**
	207-08-9	Benzo(k)fluoranthene	SIM 8270C	1.79	0.29	NSA	0.7653	**0.29**	0.0038	0.018	**0.0038**	8.98	4.22	1.5	**1.50**	0.027	NSA	0.240	**0.0272**
	218-01-9	Chrysene	SIM 8270C	17.9	2.9	NSA	7.653	**2.9**	0.0038	0.018	**0.0038**	89.8	33.4	15	**15**	0.0268	0.166	0.166	**0.0268**
	53-70-3	Dibenzo(a,h)anthracene	SIM 8270C	0.53	0.0029	NSA	0.00765	**0.0029**	0.0038	0.018	**0.0038**	2.63	0.042	0.015	**0.02**	0.006	0.033	0.033	**0.0062**
	193-39-5	Indeno(1,2,3-cd)pyrene	SIM 8270C	1.79	0.029	NSA	0.0765	**0.029**	0.0038	0.018	**0.0038**	8.98	0.422	0.15	**0.15**	0.0172	NSA	0.0170	**0.0170**
Non-Carcinogen	83-32-9	Acenaphthene	SIM 8270C	5,190	2200.000	NSA	626	**626**	0.67	0.99	**0.67**	34,900	52.3	3,400	**52.3**	0.00671	NSA	0.0067	**0.0067**
	208-96-8	Acenaphthylene	SIM 8270C	NSA	NSA	NSA	626	**626**	NSA	NSA	**NSA**	NSA	78	NSA	**78**	0.00587	NSA	0.0059	**0.0059**
	120-12-7	Anthracene	SIM 8270C	25,900	11000	NSA	3,129	**3,129**	8.3	40	**8.3**	175,000	1,040	17,000	**1,040**	0.0100	0.0572	0.0572	**0.0100**
	206-44-0	Fluoranthene	SIM 8270C	3,460	1500	NSA	417	**417**	0.13	0.14	**0.13**	23,300	364	2,300	**364**	0.03146	0.423	0.423	**0.0315**
	86-73-7	Fluorene	SIM 8270C	3,460	1500	NSA	417	**417**	1.1	5.3	**1.1**	23,300	54.8	2,300	**54.8**	0.010	NSA	0.0774	**0.0100**
	90-12-0	1-Methylnaphthalene	SIM 8270C	2,200	2	NSA	NSA	**2**	NSA	NSA	**NSA**	22	NSA	22	**22.0**	NSA	NSA	NSA	**NSA**
	91-57-6	2-Methylnaphthalene	SIM 8270C	3,290	150	NSA	NSA	**150**	NSA	NSA	**NSA**	310	NSA	310	**310.0**	NSA	NSA	NSA	**NSA**
	91-20-3	Naphthalene	SIM 8270C	14.3	0.14	NSA	209	**0.14**	NSA	NSA	**NSA**	389	1.14	3.900	**1.14**	0.01465	0.176	0.176	**0.0147**
	85-01-8	Phenanthrene	SIM 8270C	NSA	NSA	NSA	313	**313**	NSA	NSA	**NSA**	NSA	79	NSA	**79**	0.0187	0.204	0.204	**0.0187**
	129-00-0	Pyrene	SIM 8270C	2,590	1100	NSA	313	**313**	0.83	4	**0.83**	17,500	359	1,700	**359**	0.04427	0.195	0.195	**0.0443**
	191-24-2	Benzo(g,h,i)perylene	SIM 8270C	NSA	NSA	NSA	313	**313**	NSA	NSA	**NSA**	NSA	1,178	NSA	**1,178**	0.170	NSA	0.170	**0.1700**
Petroleum	-	Diesel Range Organicsaa	NWTPH-Dx	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Petroleum	-	Heavy Oils	NWTPH-Dx	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
Petroleum	-	Mineral Oil	NWTPH-Dx	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**

NOTES:

a - Analyte list is from Multi-Media, Multi-Concentration Organic Analytical Statement of Work (OLM04.3)

aa - Petroleum listed compounds are not regulated materials in the State of Idaho, however WA State Ecology analytical methods as presented will be used for characterization, using the indicated PQLs.

b - SW846 analytical method.

c - Federal Water Quality Primary Drinking Water Standard, Maximum contaminant level (MCLs).

d - Lowest value in table was used.

e- Surface water criteria assumes a hardness at 100 mg/L

IDTL - Idaho Default Target Levels.

NA - Not applicable.

NSA - No Standard Available.

The screening criteria summarized above includes information from the following sources:

National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].

Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.

Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards
EPA Removal Action Levels
(September 2008).

EPA Risk-Based Regional Screening Levels (April 2009).

EPA Freshwater Sediment Screening Benchmarks (September 2008).

Buchman, M.F. NOAA Screening Quick Reference Tables (2008)
MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality Guildelines for Freshwater Ecosystems". Archives of Enviornmental Contamination and Toxicology. 39. (2000).

Regulatory Screening Level Criteria
PCB

				GROUNDWATER					SURFACE WATER			SOIL				SEDIMENT			
Type	Analytes	CAS #	Method[a]	Federal Primary Drinking Water MCLs	IDTL for Groundwater	EPA Removal Action Levels[e,d]	EPA Regional Screening Levels - Tapwater	**Most Protective Cleanup Level for Groundwater**	Idaho DEQ Human Health Quality Criteria[c,d,e] ALL WATERS	Idaho DEQ Aquatic Life [c,d,e]	**Most Protective Cleanup Level for Groundwater**	IDTL for Soil	EPA Removal Action Levels[d,e]	EPA Regional Screening Levels[e]	**Most Protective Cleanup Level for Soil**	NOAA SQiRTs[e,d]	Consensus-Based Sed. Quality Guidelines[d,e]	EPA Freshwater Sed. Screening Benchmarks[d,e]	**Most Protective Cleanup Level for Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
PCBs	1016	12674-11-2	8082	0.5	0.730	0.5	0.96	**0.5**	0.000064	0.014	**0.000064**	2.33	24.3	3.9	**2.33**	0.026	0.0598	0.0598	**0.026**
PCBs	1221	11104-28-2	8082	0.5	0.028	0.5	0.0068	**0.0068**	0.000064	0.014	**0.000064**	0.0029	24.3	0.17	**0.0029**	0.026	0.0598	0.0598	**0.026**
PCBs	1232	11141-16-5	8082	0.5	NSA	0.5	0.0068	**0.0068**	0.000064	0.014	**0.000064**	NSA	24.3	0.17	**0.17**	0.026	0.0598	0.0598	**0.026**
PCBs	1242	53469-21-9	8082	0.5	0.028	0.5	0.034	**0.028**	0.000064	0.014	**0.000064**	0.0032	24.3	0.22	**0.0032**	0.026	0.0598	0.0598	**0.026**
PCBs	1248	12672-29-6	8082	0.5	0.028	0.5	0.034	**0.028**	0.000064	0.014	**0.000064**	0.14	24.3	0.22	**0.14**	0.026	0.0598	0.0598	**0.026**
PCBs	1254	11097-69-1	8082	0.5	0.209	0.5	0.034	**0.034**	0.000064	0.014	**0.000064**	0.74	24.3	0.22	**0.22**	0.026	0.0598	0.0598	**0.026**
PCBs	1260	11096-82-5	8082	0.5	0.028	0.5	0.034	**0.028**	0.000064	0.014	**0.000064**	0.15	24.3	0.22	**0.15**	0.026	0.0598	0.0598	**0.026**

Notes:

NSA - No standard available.
IDTL - Idaho Default Target Level
a - SW846 analytical methods.
b -The screening criteria summarized above includes information from the following sources:
National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].
Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.
Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards
EPA Removal Action Levels (September 2008).
EPA Risk-Based Regional Screening Levels (April 2009).
EPA Freshwater Sediment Screening Benchmarks (September 2008).
Buchman, M.F. NOAA Screening Quick Reference Tables (2008)
MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment
c - Surface water criteria assumes a hardness at 100 mg/L
d - Concentration is for total PCBs
e - Lowest value in table was used.

Regulatory Screening Level Criteria
Target Compound List VOC

				GROUNDWATER					SURFACE WATER		SOIL				SEDIMENT			
Type	Analytes	CAS #	Method[a]	Federal Primary Drinking Water MCLs	IDTL for Groundwater	EPA Removal Action Levels[d]	EPA Regional Screening Levels - Tapwater[d]	**Most Protective Cleanup Level for Groundwater**	Idaho DEQ Human Health Quality Criteria[c,d] ALL WATERS	**Most Protective Cleanup Level for Groundwater**	IDTL for Soil	EPA Removal Action Levels[d]	EPA Regional Screening Levels[d]	**Most Protective Cleanup Level for Soil**	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines[d]	EPA Freshwater Sed. Screening Benchmarks[d]	**Most Protective Cleanup Level for Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	**ug/L**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
VOC	1,1,1,2-Tetrachloroethane	630-20-6	8260B	NSA	2.15	52	1	**0.52**	NSA	**NSA**	0.04	197	2	**0.04**	NSA	NSA	NSA	**NSA**
VOC	1,1,1-Trichloroethane	71-55-6	8260B	200	200	200	9,100	**200**	NSA	**NSA**	2	28,100	9,000	**2**	NSA	NSA	0.03	**0.03**
VOC	1,1,2,2-Tetrachloroethane	79-34-5	8260B	NSA	0.28	7	0	**0.067**	0.17	**0.17**	0.009	58.6	0.59	**0.009**	NSA	NSA	1.36	**1.36**
VOC	1,1,2-Trichloroethane	79-00-5	8260B	5	5.00	5	0	**0.24**	0.59	**0.59**	0.014	111	1.1	**0.014**	NSA	NSA	1.24	**1.24**
VOC	1,1-Dichloroethane	75-34-3	8260B	NSA	1,043	242	2	**2.4**	NSA	**NSA**	3.48	340	3.4	**3.4**	NSA	NSA	NSA	**NSA**
VOC	1,1-Dichloroethene	75-35-4	8260B	7	7	7	340	**7**	330	**330**	0.039	778	250	**0.039**	NSA	NSA	0.03	**0.03**
VOC	1,1-Dichloropropene	563-58-6	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	1,2,3-Trichlorobenzene	87-61-6	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	0.86	**0.86**
VOC	1,2,3-Trichloropropane	96-18-4	8260B	NSA	0.028	6	0.0096	**0.0096**	NSA	**NSA**	0.00025	8.24	0.09	**0.00025**	NSA	NSA	NSA	**NSA**
VOC	1,2,4-Trichlorobenzene	120-82-1	8260B	70	70	70	8.2	**8.2**	NSA	**NSA**	0.69	285	87	**0.69**	NSA	NSA	2.1	**2.1**
VOC	1,2,4-Trimethylbenzene	95-63-6	8260B	NSA	439	44	15	**15**	NSA	**NSA**	0.19	201	67	**0.19**	NSA	NSA	NSA	**NSA**
VOC	1,2-Dibromo-3-Chloropropane	96-12-8	8260B	0.2	0.20	0.2	0.0003	**0.0003**	NSA	**NSA**	0.001	0.564	0.0056	**0.001**	NSA	NSA	NSA	**NSA**
VOC	1,2-Dichlorobenzene	95-50-1	8260B	600	600	600	370	**370**	NSA	**NSA**	5.25	73,900	2,000	**5.25**	NSA	NSA	0.017	**0.017**
VOC	1,2-Dichloroethane	107-06-2	8260B	5	5	5	0.15	**0.15**	0.38	**0.38**	0.008	44.7	0.45	**0.008**	NSA	NSA	NSA	**NSA**
VOC	1,2-Dichloropropane	78-87-5	8260B	5	5	5	0.39	**0.39**	0.5	**0.5**	0.009	50.5	0.93	**0.009**	NSA	NSA	NSA	**NSA**
VOC	1,3,5-Trimethylbenzene	108-67-8	8260B	NSA	304	37	12	**12**	NSA	**NSA**	0.145	143	47	**0.145**	NSA	NSA	NSA	**NSA**
VOC	1,3-Dichlorobenzene	541-73-1	8260B	NSA	9.39	NSA	NSA	**9.39**	NSA	**NSA**	0.229	NSA	NSA	**0.229**	NSA	NSA	4.43	**4.43**
VOC	1,3-Dichloropropane	142-28-9	8260B	NSA	NSA	1,730	730	**730**	NSA	**NSA**	NSA	16,400	1,600	**1,600**	NSA	NSA	NSA	**NSA**
VOC	1,4-Dichlorobenzene	106-46-7	8260B	75	75	75	0.43	**0.43**	NSA	**NSA**	0.076	261	2.6	**0.076**	NSA	NSA	0.599	**0.599**
VOC	2,2-Dichloropropane	594-20-7	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	2-Chlorotoluene	95-49-8	8260B	NSA	209	1,730	730	**209**	NSA	**NSA**	1.56	16,400	1,600	**1.56**	NSA	NSA	NSA	**NSA**
VOC	4-Chlorotoluene	106-43-4	8260B	NSA	NSA	6,050	2,600	**2,600**	NSA	**NSA**	NSA	57,500	5,500	**5,500**	NSA	NSA	NSA	**NSA**
VOC	4-Isopropyltoluene	99-87-6	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	Benzene	71-43-2	8260B	5	5	5	0.41	**0.41**	NSA	**NSA**	0.018	113	1.1	**0.018**	NSA	NSA	NSA	**NSA**
VOC	Bromobenzene	108-86-1	8260B	NSA	NSA	60	20	**20**	NSA	**NSA**	NSA	295	94	**94**	NSA	NSA	NSA	**NSA**
VOC	Bromoform	75-25-2	8260B	NSA	7.07	851	8.5	**7.07**	4.3	**4.3**	0.029	6,150	61	**0.029**	NSA	NSA	0.65	**0.65**
VOC	Bromomethane	74-83-9	8260B	NSA	14.60	25	8.7	**8.7**	NSA	**NSA**	0.05	24.9	7.9	**0.05**	NSA	NSA	NSA	**NSA**
VOC	Carbon tetrachloride	56-23-5	8260B	5	4.56	5	0.2	**0.2**	0.23	**0.23**	0.01	25.4	0.25	**0.01**	NSA	NSA	0.064	**0.064**
VOC	Chlorobenzene	108-90-7	8260B	100	100	100	91	**91**	130	**130**	0.62	1,080	310	**0.62**	NSA	NSA	0.0084	**0.0084**
VOC	Chlorobromomethane	74-97-5	8260B	NSA	NSA	NSA	NSA	**NSA**	0.4	**0.4**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	Chlorodibromomethane	124-48-1	8260B	NSA	NSA	80	0.15	**0.15**	0.4	**0.4**	NSA	578	0.7	**0.7**	NSA	NSA	NSA	**NSA**
VOC	Chloroethane	75-00-3	8260B	NSA	19	62,600	21,000	**19**	NSA	**NSA**	0.053	44,100	15,000	**0.053**	NSA	NSA	NSA	**NSA**
VOC	Chloroform	67-66-3	8260B	NSA	1.80	19	0.19	**0.19**	5.7	**5.7**	0.006	30.4	0.3	**0.006**	NSA	NSA	NSA	**NSA**
VOC	Chloromethane	74-87-3	8260B	NSA	4.3	563	190	**4.3**	NSA	**NSA**	0.023	361	120	**0.023**	NSA	NSA	NSA	**NSA**
VOC	cis-1,2-Dichloroethene	156-59-2	8260B	70	70	70	370	**70**	NSA	**NSA**	0.19	8,210	780	**0.19**	NSA	NSA	NSA	**NSA**
VOC	cis-1,3-Dichloropropene	10061-01-5	8260B	NSA	0.56	NSA	NSA	**0.56**	NSA	**NSA**	0.002	NSA	NSA	**0.002**	NSA	NSA	NSA	**NSA**
VOC	Dibromomethane	74-95-3	8260B	NSA	NSA	NSA	370	**370**	NSA	**NSA**	NSA	NSA	780	**780**	NSA	NSA	NSA	**NSA**
VOC	Dichlorobromomethane	75-27-4	8260B	NSA	0.90	108	0.12	**0.12**	0.55	**0.55**	0.0027	1,030	0.28	**0.0027**	NSA	NSA	NSA	**NSA**
VOC	Dichlorodifluoromethane	75-71-8	8260B	NSA	195	17,300	390	**195**	NSA	**NSA**	2.96	164,000	190	**2.96**	NSA	NSA	NSA	**NSA**
VOC	Ethylbenzene	100-41-4	8260B	700	700	700	1.5	**1.5**	530	**530**	10.2	574	5.7	**5.7**	NSA	NSA	1.1	**1.1**
VOC	Ethylene Dibromide	106-93-4	8260B	0	0.05	0.05	0.0065	**0.0065**	NSA	**NSA**	0.0001	3.440	0.034	**0.0001**	NSA	NSA	NSA	**NSA**
VOC	Hexachlorobutadiene	87-68-3	8260B	NSA	0.72	86	0.86	**0.72**	NSA	**NSA**	0.038	622	6.2	**0.038**	NSA	NSA	NSA	**NSA**
VOC	Isopropylbenzene	98-82-8	8260B	NSA	1,043	1,940	680	**680**	NSA	**NSA**	3.46	8,130	2,200	**3.46**	NSA	NSA	0.086	**0.086**
VOC	Methylene Chloride	75-09-2	8260B	5	7.45	5	4.8	**4.8**	4.6	**4.6**	0.017	1,090	11	**0.017**	NSA	NSA	NSA	**NSA**
VOC	m-Xylene & p-Xylene	136777-61-	8260B	10,000	4,340	10,000	200	**200**	NSA	**NSA**	1.67	1,840	600	**1.67**	NSA	NSA	0.025	**0.025**
VOC	Naphthalene	91-20-3	8260B	NSA	209	14.3	0.14	**0.14**	NSA	**NSA**	1.14	389	3.9	**1.14**	14.65	176	0.176	**0.176**

Regulatory Screening Level Criteria
Target Compound List VOC

				GROUNDWATER					SURFACE WATER		SOIL				SEDIMENT			
Type	Analytes	CAS #	Method[a]	Federal Primary Drinking Water MCLs	IDTL for Groundwater	EPA Removal Action Levels[d]	EPA Regional Screening Levels - Tapwater[d]	**Most Protective Cleanup Level for Groundwater**	Idaho DEQ Human Health Quality Criteria[c,d] ALL WATERS	**Most Protective Cleanup Level for Groundwater**	IDTL for Soil	EPA Removal Action Levels[d]	EPA Regional Screening Levels[d]	**Most Protective Cleanup Level for Soil**	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines[d]	EPA Freshwater Sed. Screening Benchmarks[d]	**Most Protective Cleanup Level for Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	**ug/L**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
VOC	n-Butylbenzene	104-51-8	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	N-Propylbenzene	103-65-1	8260B	NSA	NSA	NSA	NSA	**NSA**	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
VOC	o-Xylene	95-47-6	8260B	NSA	NSA	4,380	1,400	**1,400**	NSA	**NSA**	NSA	16,300	5,300	**5,300**	NSA	NSA	NSA	**NSA**
VOC	sec-Butylbenzene	135-98-8	8260B	NSA	104	NSA	NSA	**104**	NSA	**NSA**	1.17	NSA	NSA	**1.17**	NSA	NSA	NSA	**NSA**
VOC	Styrene	100-42-5	8260B	100	100	100	1,600	**100**	NSA	**NSA**	1.83	28,000	6,500	**1.83**	NSA	NSA	0.56	**0.56**
VOC	tert-Butylbenzene	98-06-6	8260B	NSA	104	NSA	NSA	**104**	NSA	**NSA**	0.85	NSA	NSA	**0.85**	NSA	NSA	NSA	**NSA**
VOC	Tetrachloroethene	127-18-4	8260B	5	5	5	0.11	**0.11**	0.69	**0.69**	0.029	56.700	0.570	**0.029**	NSA	NSA	0.47	**0.47**
VOC	Toluene	108-88-3	8260B	1,000	1,000	1,000	2,300	**1,000**	1,300	**1300**	4.89	35,400	5,000	**4.89**	NSA	NSA	NSA	**NSA**
VOC	trans-1,2-Dichloroethene	156-60-5	8260B	110	100	100	110	**100**	140	**140**	0.36	355	110	**0.36**	NSA	NSA	1.05	**1.05**
VOC	trans-1,3-Dichloropropene	10061-02-6	8260B	NSA	0.56	NSA	NSA	**0.56**	NSA	**NSA**	0.002	NSA	NSA	**0.002**	NSA	NSA	NSA	**NSA**
VOC	Trichloroethene	79-01-6	8260B	5	3.32	5	1.7	**1.7**	2.5	**2.5**	0.003	283	2.800	**0.003**	NSA	NSA	0.097	**0.097**
VOC	Trichlorofluoromethane	75-69-4	8260B	NSA	2,050	25,900	1,300	**1,300**	NSA	**NSA**	10.4	246,000	800	**10.4**	NSA	NSA	NSA	**NSA**
VOC	Vinyl chloride	75-01-4	8260B	2	2	2	0.016	**0.016**	0.025	**0.025**	0.01	5.99	0.06	**0.01**	NSA	NSA	0.031	**0.031**

Notes:

NSA - No standard available.
IDTL - Idaho Default Target Level
a - SW846 analytical methods.
b -The screening criteria summarized above includes information from the following sources:
National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].
Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.
Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards
EPA Removal Action Levels (September 2008).
EPA Risk-Based Regional Screening Levels (April 2009).
EPA Freshwater Sediment Screening Benchmarks (September 2008).
Buchman, M.F. NOAA Screening Quick Reference Tables (2008)
MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality
c - Surface water criteria assumes a hardness at 100 mg/L
d - Lowest value in table was used.

Regulatory Screening Level Criteria
Target Compound List SVOC

				GROUNDWATER					SURFACE WATER			SOIL				SEDIMENT			
Type	Analytes	CAS #	Method[a]	Federal Primary Drinking Water MCLs	IDTL for Groundwater	EPA Removal Action Levels[d]	EPA Regional Screening Levels - Tapwater[d]	**Most Protective Cleanup Level - Groundwater**	Idaho DEQ Aquatic Life Criteria[c,d]	Idaho DEQ Human Health Quality Criteria[c,d] ALL WATERS	**Most Protective Cleanup Level - Groundwater**	IDTL for Soil	EPA Removal Action Levels[d]	EPA Regional Screening Levels[d]	**Most Protective Cleanup Level - Soil**	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines[d]	EPA Freshwater Sed. Screening Benchmarks[d]	**Most Protective Cleanup Level - Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
SVOC	1,2,4-Trichlorobenzene	120-82-1	8270C	70	70	70	8.2	**8.2**	NSA	35	**35**	0.69	285	87	**0.69**	NSA	NSA	2.1	**2.1**
SVOC	1,2-Dichlorobenzene	95-50-1	8270C	600	600	600	370	**370**	NSA	420	**420**	5.25	73,900	2,000	**5.25**	NSA	NSA	0.0165	**0.0165**
SVOC	1,3-Dichlorobenzene	541-73-1	8270C	NSA	9.39	NSA	NSA	**9.39**	NSA	320	**320**	0.23	NSA	NSA	**0.23**	NSA	NSA	4.43	**4.43**
SVOC	1,4-Dichlorobenzene	106-46-7	8270C	75	75	75	0.43	**0.43**	NSA	63	**63**	0.076	261	2.6	**0.076**	NSA	NSA	0.599	**0.599**
SVOC	1-Methylnaphthalene	90-12-0	8270C	NSA	NSA	232	2.3	**2.3**	NSA	NSA	**NSA**	NSA	2,200	22	**22**	NSA	NSA	NSA	**NSA**
SVOC	2,2'-oxybis[1-chloropropane]	108-60-1	8270C	NSA	NSA	3,460	0.32	**0.32**	NSA	NSA	**NSA**	NSA	32,900	3.5	**3.5**	NSA	NSA	NSA	**NSA**
SVOC	2,4,5-Trichlorophenol	95-95-4	8270C	NSA	1,043	8,640	3,700	**1043**	NSA	NSA	**NSA**	7.4	62,400	6,100	**7.4**	NSA	NSA	NSA	**NSA**
SVOC	2,4,6-Trichlorophenol	88-06-2	8270C	NSA	1.04	86	6.1	**1.04**	NSA	1.4	**1.4**	0.004	624	44	**0.004**	NSA	NSA	0.213	**0.213**
SVOC	2,4-Dichlorophenol	120-83-2	8270C	NSA	31.29	259	110	**31.29**	NSA	77	**77**	0.098	1,870	180	**0.098**	NSA	NSA	0.177	**0.177**
SVOC	2,4-Dimethylphenol	105-67-9	8270C	NSA	209	1,730	730	**209**	NSA	380	**380**	0.82	12,500	1,200	**0.82**	NSA	NSA	0.029	**0.029**
SVOC	2,4-Dinitrophenol	51-28-5	8270C	NSA	20.86	173	73	**20.86**	NSA	69	**69**	0.038	1,250	120	**0.038**	NSA	NSA	NSA	**NSA**
SVOC	2,4-Dinitrotoluene	121-14-2	8270C	NSA	0.08	173	0.22	**0.08**	NSA	0.11	**0.11**	0.00029	1,240	1.6	**0.00029**	NSA	NSA	0.0416	**0.0416**
SVOC	2,6-Dinitrotoluene	606-20-2	8270C	NSA	0.08	86	37	**0.08**	NSA	NSA	**NSA**	0.00021	626	61	**0.00021**	NSA	NSA	NSA	**NSA**
SVOC	2-Chloronaphthalene	91-58-7	8270C	NSA	834	6,920	2,900	**834**	NSA	1,000	**1,000**	128	65,700	6,300	**128**	NSA	NSA	NSA	**NSA**
SVOC	2-Chlorophenol	95-57-8	8270C	NSA	52.14	432	180	**52.14**	NSA	81	**81**	0.36	4,110	390	**0.36**	NSA	NSA	NSA	**NSA**
SVOC	2-Methylnaphthalene	91-57-6	8270C	NSA	NSA	346	150	**150**	NSA	NSA	**NSA**	NSA	3,290	310	**310**	NSA	NSA	0.0202	**0.0202**
SVOC	2-Methylphenol	95-48-7	8270C	NSA	521	4,320	1,800	**521**	NSA	NSA	**NSA**	1.8	31,200	3,100	**1.8**	NSA	NSA	NSA	**NSA**
SVOC	2-Nitroaniline	88-74-4	8270C	NSA	31.30	NSA	110	**31.3**	NSA	NSA	**NSA**	0.073	NSA	180	**0.073**	NSA	NSA	NSA	**NSA**
SVOC	2-Nitrophenol	88-75-5	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
SVOC	3 & 4 Methylphenol	15831-10-4	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
SVOC	3,3'-Dichlorobenzidine	91-94-1	8270C	NSA	0.12	14.9	0.15	**0.12**	NSA	0.021	**0.021**	0.0018	108	1.1	**0.0018**	NSA	NSA	0.127	**0.127**
SVOC	3-Nitroaniline	99-09-2	8270C	NSA	1.47	25.9	NSA	**1.47**	NSA	NSA	**NSA**	0.0032	187	NSA	**0.0032**	NSA	NSA	NSA	**NSA**
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	8270C	NSA	NSA	8.64	3.7	**3.70**	NSA	13	**13**	NSA	62	6.1	**6.1**	NSA	NSA	NSA	**NSA**
SVOC	4-Bromophenyl phenyl ether	101-55-3	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	1.23	**1.23**
SVOC	4-Chloro-3-methylphenol	59-50-7	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
SVOC	4-Chloroaniline	106-47-8	8270C	NSA	41.71	125	0.34	**0.34**	NSA	NSA	**NSA**	0.13	899	2.4	**0.13**	NSA	NSA	NSA	**NSA**
SVOC	4-Chlorophenyl phenyl ether	7005-72-3	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
SVOC	4-Nitroaniline	100-01-6	8270C	NSA	1.47	259	3.4	**1.47**	NSA	NSA	**NSA**	0.003	1,870	24	**0.003**	NSA	NSA	NSA	**NSA**
SVOC	4-Nitrophenol	100-02-7	8270C	NSA	83.43	NSA	NSA	**83.43**	NSA	NSA	**NSA**	0.23	NSA	NSA	**0.23**	NSA	NSA	NSA	**NSA**
SVOC	Acenaphthene	83-32-9	8270C	NSA	626	5,190	2,200	**626**	NSA	670	**670**	52	34,900	3,400	**52**	6.71	NSA	0.0067	**0.0067**
SVOC	Acenaphthylene	208-96-8	8270C	NSA	626	NSA	NSA	**626**	NSA	NSA	**NSA**	78	NSA	NSA	**78**	5.87	NSA	0.0059	**0.0059**
SVOC	Anthracene	120-12-7	8270C	NSA	3,129	25,900	11,000	**3,129**	NSA	8,300	**8,300**	1,040	175,000	17,000	**1,040**	10	0.0572	0.0572	**0.0572**
SVOC	Benzo[a]anthracene	56-55-3	8270C	NSA	0.077	1.79	0.029	**0.029**	NSA	0.0038	**0.0038**	0.42	8.98	0.15	**0.15**	15.72	0.108	0.108	**0.108**
SVOC	Benzo[a]pyrene	50-32-8	8270C	0.2	0.20	0.20	0.0029	**0.0029**	NSA	0.0038	**0.0038**	0.042	1.48	0.015	**0.015**	31.9	0.15	0.15	**0.15**
SVOC	Benzo[b]fluoranthene	205-99-2	8270C	NSA	0.077	1.79	0.029	**0.029**	NSA	0.0038	**0.0038**	0.42	8.98	0.15	**0.15**	NSA	NSA	0.0272	**0.0272**
SVOC	Benzo[g,h,i]perylene	191-24-2	8270C	NSA	313	NSA	NSA	**313**	NSA	NSA	**NSA**	1,178	NSA	NSA	**1,178**	170	NSA	0.17	**0.17**
SVOC	Benzo[k]fluoranthene	207-08-9	8270C	NSA	0.77	1.79	0.29	**0.29**	NSA	0.0038	**0.0038**	4.2	8.98	1.5	**1.50**	27.2	NSA	0.24	**0.24**
SVOC	Benzoic acid	65-85-0	8270C	NSA	41,714	346,000	150,000	**41,714**	NSA	NSA	**NSA**	77	2,500,000	240,000	**77**	NSA	NSA	0.65	**0.65**
SVOC	Benzyl alcohol	100-51-6	8270C	NSA	3,129	43,200	18,000	**3,129**	NSA	NSA	**NSA**	6.43	312,000	31,000	**6.43**	NSA	NSA	NSA	**NSA**
SVOC	Bis(2-chloroethoxy)methane	111-91-1	8270C	NSA	NSA	259	110	**110**	NSA	NSA	**NSA**	NSA	1,870	180	**180**	NSA	NSA	NSA	**NSA**
SVOC	Bis(2-chloroethyl)ether	111-44-4	8270C	NSA	0.05	1.19	0.012	**0.012**	NSA	0.03	**0.03**	0.0001	18.5	0.19	**0.0001**	NSA	NSA	NSA	**NSA**
SVOC	Bis(2-ethylhexyl) phthalate	117-81-7	8270C	6	6	6	4.8	**4.8**	NSA	1.2	**1.2**	11.8	3,470	35	**11.8**	750	NSA	0.18	**0.18**
SVOC	Butyl benzyl phthalate	85-68-7	8270C	NSA	2,086	3,540	35	**35**	NSA	1,500	**1,500**	511	25,600	260	**260**	NSA	NSA	10.9	**10.9**
SVOC	Carbazole	86-74-8	8270C	NSA	NSA	NSA	NSA	**NSA**	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**	NSA	NSA	NSA	**NSA**
SVOC	Chrysene	218-01-9	8270C	NSA	7.65	18	2.9	**3**	NSA	0.0038	**0.0038**	33.4	90	15	**15**	26.83	0.166	0.166	**0.166**
SVOC	Dibenz(a,h)anthracene	53-70-3	8270C	NSA	0.0077	0.53	0.0029	**0.0029**	NSA	0.0038	**0.0038**	0.042	2.63	0.015	**0.015**	6.22	0.033	0.033	**0.033**
SVOC	Dibenzofuran	132-64-9	8270C	NSA	41.71	NSA	NSA	**42**	NSA	NSA	**NSA**	6.1	NSA	NSA	**6.1**	5100	NSA	0.415	**0.415**
SVOC	Diethyl phthalate	84-66-2	8270C	NSA	8,343	69,200	29,000	**8,343**	NSA	17,000	**17,000**	27.5	499,000	49,000	**27.5**	NSA	NSA	0.603	**0.603**
SVOC	Dimethyl phthalate	131-11-3	8270C	NSA	104,286	NSA	NSA	**104,286**	NSA	270,000	**270,000**	271	NSA	NSA	**271**	NSA	NSA	NSA	**NSA**
SVOC	Di-n-butyl phthalate	84-74-2	8270C	NSA	1,043	8,640	3,700	**1,043**	NSA	2,000	**2,000**	31.0	62,400	6,100	**31.0**	110	NSA	6.47	**6.47**
SVOC	Di-n-octyl phthalate	117-84-0	8270C	NSA	417	NSA	NSA	**417**	NSA	NSA	**NSA**	1,829	NSA	NSA	**1,829**	NSA	NSA	NSA	**NSA**
SVOC	Fluoranthene	206-44-0	8270C	NSA	417	3,460	1,500	**417**	NSA	130	**130**	364	23,300	2,300	**364**	31.46	0.426	0.423	**0.423**

Regulatory Screening Level Criteria
Target Compound List SVOC

				GROUNDWATER					SURFACE WATER			SOIL				SEDIMENT			
Type	Analytes	CAS #	Method[a]	Federal Primary Drinking Water MCLs	IDTL for Groundwater	EPA Removal Action Levels[d]	EPA Regional Screening Levels - Tapwater[d]	**Most Protective Cleanup Level - Groundwater**	Idaho DEQ Aquatic Life Criteria[c,d]	Idaho DEQ Human Health Quality Criteria[c,d] ALL WATERS	**Most Protective Cleanup Level - Groundwater**	IDTL for Soil	EPA Removal Action Levels[d]	EPA Regional Screening Levels[d]	**Most Protective Cleanup Level - Soil**	NOAA SQiRTs[d]	Consensus-Based Sed. Quality Guidelines[d]	EPA Freshwater Sed. Screening Benchmarks[d]	**Most Protective Cleanup Level - Soil**
				ug/L	ug/L	ug/L	ug/L	**ug/L**	ug/L	ug/L	**ug/L**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**	mg/Kg	mg/Kg	mg/Kg	**mg/Kg**
SVOC	Fluorene	86-73-7	8270C	NSA	417	3,460	1,500	**417**	NSA	1,100	**1,100**	54.8	23,300	2,300	**54.8**	10	0.0774	0.0774	**0.0774**
SVOC	Hexachlorobenzene	118-74-1	8270C	1	1	1	0.04	**0.04**	NSA	0	**0**	0.043	30	0.3	**0.043**	20	NSA	0.02	**0.02**
SVOC	Hexachlorobutadiene	87-68-3	8270C	NSA	0.72	86	0.86	**0.72**	NSA	0.44	**0.44**	0.038	622	6.2	**0.038**	NSA	NSA	NSA	**NSA**
SVOC	Hexachlorocyclopentadiene	77-47-4	8270C	50	7.01	50	220	**7.01**	NSA	40	**40**	0.012	3,730	370	**0.012**	3	NSA	NSA	**3**
SVOC	Hexachloroethane	67-72-1	8270C	NSA	3.99	86	5	**3.99**	NSA	1.4	**1.4**	0.14	624	35	**0.14**	NSA	NSA	1.027	**1.027**
SVOC	Indeno[1,2,3-cd]pyrene	193-39-5	8270C	NSA	0.077	1.79	0.029	**0.029**	NSA	0	**0**	0.42	8.98	0.15	**0.15**	17.32	NSA	0.017	**0.017**
SVOC	Isophorone	78-59-1	8270C	NSA	58.80	7,080	71	**58.80**	NSA	35	**35**	0.14	51,100	510	**0.14**	NSA	NSA	NSA	**NSA**
SVOC	Naphthalene	91-20-3	8270C	NSA	209	14	0.14	**0.14**	NSA	NSA	**NSA**	1.14	389	3.9	**1.14**	14.65	0.176	0.176	**0.176**
SVOC	Nitrobenzene	98-95-3	8270C	NSA	5.21	43	0.12	**0.12**	NSA	17	**17**	0.02	411	4.4	**0.02**	NSA	NSA	NSA	**NSA**
SVOC	N-Nitrosodi-n-propylamine	621-64-7	8270C	NSA	0.00798	0.96	0.0096	**0.00798**	NSA	0.00069	**0.00069**	0.000018	6.94	0.1	**0.000018**	NSA	NSA	NSA	**NSA**
SVOC	N-Nitrosodiphenylamine	86-30-6	8270C	NSA	11.4	1,370	14	**11.40**	NSA	3.3	**3.3**	0.088	9,910	99	**0.088**	NSA	NSA	2.68	**2.68**
SVOC	Pentachlorophenol	87-86-5	8270C	1	1	1	0.56	**0.56**	13	0.27	**0.27**	0.009	297	3	**0.009**	NSA	NSA	0.504	**0.504**
SVOC	Phenanthrene	85-01-8	8270C	NSA	313	NSA	NSA	**313**	NSA	NSA	**NSA**	79	NSA	NSA	**79**	18.73	0.204	0.204	**0.204**
SVOC	Phenol	108-95-2	8270C	NSA	3,129	25,900	11,000	**3,129**	NSA	21,000	**21,000**	7.4	187,000	18,000	**7.4**	48	NSA	0.42	**0.42**
SVOC	Pyrene	129-00-0	8270C	NSA	313	2,590	1,100	**313**	NSA	830	**830**	359	17,500	1,700	**359**	44.27	0.195	0.195	**0.195**

Notes:
NSA - No standard available.
IDTL - Idaho Default Target Level
a - SW846 analytical methods.
b -The screening criteria summarized above includes information from the following sources:
National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].
Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.
Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards
EPA Removal Action Levels (September 2008).
EPA Risk-Based Regional Screening Levels (April 2009).
EPA Freshwater Sediment Screening Benchmarks (September 2008).
Buchman, M.F. NOAA Screening Quick Reference Tables (2008)
MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. "Development and Evaluation of Consensus-Based Sediment Quality
c - Surface water criteria assumes a hardness at 100 mg/L
d - Lowest value in table was used.

ATTACHMENT C

HEALTH AND SAFETY PLAN (HASP)

Project Name: **Avery Landing Site Engineering Evaluation** *Project #:* **073-93312-02**

Location of Project The Site is located along State Highway 5 about 0.75 mile west of the town of Avery, Idaho *Date prepared:* **9/26/08, Rev 1/23/09**

Site Description: This Engineering Evaluation will collect, develop, and evaluate sufficient information regarding the Site to recommend an appropriate removal action. Field activities will include:

- A characterization of the nature, extent, and potential sources of contamination at the Site
- An assessment of the groundwater and surface water impacts from the Site contamination
- An evaluation of the potential routes of exposure and risks to human and ecological receptors associated with contamination at the site

This section provides a description of Golder's proposed field investigations for better understanding the nature and extent of COPCs and potential Site risks. The HASP information for field investigations specific for the Treatability Study, Biological Assessment, and Cultural Resources will be addressed in addendums to this HASP.

- Additional Monitoring Well Installation
- Groundwater Hydraulic Gradient Investigation
- Groundwater Sampling
- Groundwater Pump Tests
- Near Shore Floating LNAPL and Surface Water Sampling

Project Manager: **Douglas Morell** *signature* 6/23/2009 *Date:*

Office Health & Safety Coordinator **Jane Mills** *Signature* JBMills *Date:* 6/23/09

EMERGENCY ACTION PLAN

Emergency Contact & Services

Title	*Name*	*Contact #'s*
Site Safety Officer	TBD	(208) 755-3002
First Aid/CPR	TBD	(208) 755-3002
Project Manager	Douglas Morell	(425)351-7451
Office H&S Coordinator	Jane Mills	(206)295-7002
Client Contact		

Title	*Name*	*Contact #'s*
Hospital	Benewah Community Hospital	(208) 245-5551
Fire Dept.	Fire Departments & Districts Wallace Idaho 83873	208-752-1101
Ambulance		
Golder Corporate Safety Officer	Charlie Haury	904-607-6057 cell

How to Contact First Aid

1. Method of Communication: 911 — Location of First Aid: 1st Aid kit will be maintained in the Golder project vehicle
2. Channel or phone number to be used N;/A
3. Name of person(s) providing First Aid Golder on-site staff

Nearest Telephone if outside assistance is required: Residential properties located adjacent to the west of the site.

Fire / Explosion or other Emergencies Requiring Evacuation:

In the event of a fire or explosion, if the situation can be readily controlled with available resources without jeopardizing your health and safety or the health and safety of the public, or other site personnel, take immediate action to do so, otherwise:

1. Notify emergency personnel by calling 911
2. If possible, isolate the fire to prevent spreading.
3. Evacuate the area.
4. Assemble at Muster Station — ***Muster Station Location*:** On the road along Highway 5
5. Perform head count to ensure complete evacuation
6. Inform Emergency Personnel of any missing team members

Golder personnel and all subcontractors will have a fire extinguisher inside of their respective field vehicles at all times while working onsite.

On Site Injury or Illness:

In the event of an injury requiring more than minor first aid, or any employee reporting symptom(s) of illness, or exposure to hazardous substances, immediately take the victim to:

Benewah Community Hospital • 229 South 7th Street • St. Maries, ID 83861 • (208) 245-5551

Benewah Community Hospital's Emergency Room is fully physician staffed, 24 hours a day, 7 days a week, with medical services available to handle a full range of serious injuries and illnesses. Board Certified emergency physicians and nurses, specially trained in critical care and emergency life saving with Advanced Life Support training in trauma, cardiac and pediatrics, staff our ER. Other physicians, well-trained nurses, and technologists, round out the ER team. If, after initial examination and stabilization, it is determined to be in the best interest of the patient, the hospital's life flight partner, Med Star, transports patients via helicopter to one of three major trauma hospitals within a 60 mile radius.

The Benewah hospital is located 47 miles and approximately 1 hour drive west of the site.

Driving directions to Benewah Community Hospital:

1. Turn **left** at **NFD 50 Rd/St Joe River Rd** (44 miles)
2. Turn **left** at **ID-3**
3. Continue on **S 3rd St**
4. Turn **right** at **W Jefferson Ave**
5. Turn **right** at **S 7th St**

PRE – DEPARTURE

IMPORTANT THINGS TO CHECK & REMEMBER

1. Look at the bottom of this page, and ensure that your Project Manager and Office Health & Safety Coordinator have approved this HASP.
2. Ensure that your Project Manager has discussed in detail this HASP, gone through the Hazard Assessment with you and explained the hazards associated with the work that you will be performing.
3. Ensure that you have all the required PPE and are trained in the areas which are indicated in this HASP.
4. Familiarize yourself with the Emergency Action Plan for the site prior to site arrival.
5. Check the weather in the immediate area of the project site to ensure that the current weather conditions do not create additional hazards that have not been evaluated.
6. Inquire about cell phone coverage (satellite phones may be the ONLY option in some locations) and physically test all of your means of communication to ensure that they function, and you are familiar with the controls.
7. If you are going to a site where activities are in progress, do not begin work until you have been given an orientation from the Site Safety Officer and have reviewed the site's Health & Safety Manual.
8. **You have the right to refuse any work that you feel is unsafe, or that you are not trained to do. Please discuss your concerns immediately with the project manager and office HSC.**

FIELDWORK HEALTH & SAFETY PLAN

Project Personnel							
Team Member	Function	Cell Ph. #	Other cont. #	Allergies	Emergency Contact		Init.*
					Name	Phone #	
**	**	**	**	**	**	**	**
	Contact Person			N/A	N/A	N/A	N/A

***All Golder Project Personnel must initial in this column beside their name to indicate that they have read & understood the project Health & Safety Plan**

**** Specific Golder Project Personnel information will be added prior to the initiation of on-site project activities.**

Special Instructions

1.	Must determine additional H&S requirements from Site Personnel prior to starting work.
2.	*[Information to be added as identified]*
3.	
4.	
5.	

HAZARD ASSESSMENT

Date: 9/26/08 Rev 1/23/09 **Assessment Performed By:** Jane Mills/Douglas Morell

Location: Avery, Idaho

Description Of Site : The site is a former railroad maintenance yard.

Work To Be Done: Please review detail below.

Excavations for Soil Bulk Sample Acquisitions

The soil investigation will focus on evaluation of the soil in 3 to 4 locations across the Site. The investigation will be conducted with an excavator removing soils to a depth of approximately 8' to 15' below ground surface. Golder will collect soil samples from the excavator bucket as they are retrieved by the excavating equipment. At no time will any Golder employee or subcontractor employee enter the excavation. Each excavation location will be re-filled once sampling is complete, and the excavation soils will be compacted with the excavator bucket.

Additional Monitoring Well Installation

The groundwater investigation will focus on the groundwater directly beneath the Site. A number of monitoring wells installed by EPA and Potlatch currently exist on the Site. During the investigation, one additional monitoring well (designated GA-1) will be installed between the St. Joe River and the existing monitoring well HC-1R. After monitoring well GA-1 installation is complete, the well will be surveyed for x, y, and z coordinates using the same datum used for the other existing Site wells.

Groundwater Hydraulic Gradient Investigation

To better understand the flow of groundwater at the Site, monitoring wells will be monitored for groundwater levels (elevations) changes. The water levels in the wells will be monitored monthly, depending on weather conditions for access. A temporary staging station will be installed near the Site on the St. Joe River for measurements of river water levels. The up-stream bridge at Avery, Idaho may be used to establish a temporary river stage station if one does not exist in the area.

Groundwater Sampling

Two groundwater sampling events are proposed confirm analytical results. Each well will be inspected for the presence of a floating LNAPL and where present its thickness will be estimated. A sample of the floating LNAPL will be obtained from two monitoring wells, MW-11 and HC-4, which historically had significant thickness of the floating LNAPL. The LNAPL form these wells will be analyzed for the list of COPCs.

The groundwater samples will be obtained in a manner that will reduce entrained settleable soils particles and LNAPL carry-down. Two samples will be obtained from each well for metal analyses with one being inline filtered prior to preservation. The results will be used to evaluate whether additional wells are needed in a Phase II investigation. Wells will be surveyed and water-level elevations measured on the same day and prior to any groundwater purging or sampling.

Groundwater Pump Tests

Short–term slug tests will be performed on 4 selected monitoring wells. The selection of wells for slug-testing will be based on well installation documentation, field inspections, and aerial representativeness.

Near Shore Floating LNAPL and Surface Water Sampling

The St. Joe River water will be sampled along the river embankment to assess discharges and impacts from the Site. Two sampling events will be conducted that coincide with the two groundwater sampling events. River station RS-1 will represent up-river background for comparison to river stations RS-2 through RS-5. At each river station, samples of any floating product (except at RS-1) and surface water will be obtained. The samples will be analyzed for the list of COPCs.

Hazard		Notes	Necessary Controls	Standard Work Procedure Attached (see appendix)
Travel to site:				
Aircraft	☐			
Helicopter	☐			
Boat	☐			☐Working on or over water
Public or Private Roads/Driving	☒	Golder personnel will drive to and from the project site.	Defensive driving methods will be employed at all times when operating motor vehicles	☒Motor Vehicles and Driving on Company Business
Other	☐			
Site Terrain				
Shafts/Trenches/Slopes	☐			☐Trenching and Shoring
Overhead Hazards	☐			☐Overhead Hazards
Water Hazards	☒	Some surface water and sediment sampling will be conducted along the St. Joe river embankment	At no time will the Golder employee collecting the sample enter the water. At all times employees should be aware of the condition of the ground surface at the edge of the water. During near shore sampling activities appropriate personal flotation devices must be worn.	☒Working on or over water
Underground Utilities	☒	Utility locate investigations will be conducted prior to drilling the new groundwater monitoring well.	No drilling will be conducted on the site until completion of the utility locate can be confirmed, either by observing markings on the ground indicating locations of buried utilities, or direct confirmation with the utility locate. Public right-of-way will be located using a public locating service, and all other areas will be located using a private locating service and a geophysical investigation.	☒Underground Utilities
Confined Space(s)	☐	An additional Plan is required for this hazard- See Appendix		☐Work in Confined Spaces
Slip,Trip / Fall Hazards	☐			☐Slips, Trips and Falls
Other	☐			
Work at Heights				
Ladders/ Scaffolds	☐			
Work Platforms	☐			
Shafts	☐			
General Work Environment				
Heat Stress	☐			☐Heat Stress
Cold Stress	☒	Work may be conducted during the Fall and Winter when temperatures may dip below 50 degrees F	Golder employees will be prepared at all times with sufficient warm clothing and a change of clothes in the event that their clothing becomes wet during a work shift.	☒Cold Stress
Lightening/Tornado/ Hurricane/Severe Weather	☐			☐Inclement Weather
Remote Site	☒	The site is adjacent to a transitory camping ground that does not necessarily have permanent residents. The closest towns are St. Marie's and Wallace, both over one hour away from the site.	Golder personnel will make contact with the Project Manager or Director daily at prescribed times as defined in the Project Site Contact Form included in this HASP.	☐Remote Isolated Surveys
Noise Levels	☒	When mechanical equipment is operating (excavator and drill rig)		☒Hearing Protection
Wild Animal Habitat	☐			☐Biological Exposure Risks
Housekeeping	☐			☐Housekeeping
Poor Lighting	☐			
Extended work hours	☐			
Working Alone	☐			
Proximity to Traffic	☐			☐ Motor Vehicles and Driving on Company

				Business
Other	☐			
Mechanical Process: Unstable Structures	☐			
Moving Parts/Heavy Equipment	☐			☐Working Around Heavy Equipment
Drilling / Pile Driving	☒	Drilling will be conducted during parts of this project	Golder employees will follow the SWP.	☒Drilling
Excavation	☒	Excavation will be conducted during parts of this project	Golder employees will follow the SWP.	☒Trenching and Shoring

Hazard		Notes	Necessary Controls	Standard Work Procedure Attached (see appendix)
Chemical & Biological Contaminants				
Dust	☐			☐Respiratory Protection
Carcinogens	☐			☐ Chemical Exposure Risks** ** fill out table below ☐Respiratory Protection
Radioactive Particles	☐			
Oxygen deficient	☐			
Asbestos	☐			☐Respiratory Protection
Explosive atmosphere	☐			
Mold	☐			
Insects (e.g., ticks)	☒	During the summer months mosquitoes and tics may be a biological hazard at the site.	Insect repellent and proper tick protection measures should be employed during the summer months.	☒ Biological Exposure Risks
Chemical contaminants	☒	The following is a list of chemicals of potential concern at the Site: • Diesel and heavy oil • Napthalenes • PAHs (including carcinogenic PAHs) • Metals in the Ground Water		☐ Chemical Exposure Risks** ** fill out table below ☐Respiratory Protection
Other contaminants	☐			
Fire	☐			
Chemical Storage	☐			
Compressed Gas	☐			
Explosives (storage)	☐			
Explosives (transport)	☐			
Nuclear Densometer	☐			Must have office Radiation Safety Plan attached and at the job Site
Other	☐			
Other Site Issues				
Landfill CQA	☐			☐Landfill CQA
Landfill Gas	☐			☐Landfill Gas Sampling
Hand and Power Tools	☐			☐Hand and Portable Power Tools
GOLDER Hired Contractors	☐			
Possible exposure to violence from general public	☐			
Cellular Phone Usage	☒	The site may have limited cell phone coverage.	Precautions should be made to ensure that communications with the home office and the project manager occur daily.	☒Cellular Telephone Use
Projectiles / Sharps	☐			
	☐			
	☐			
	☐			
	☐			

OSHA CONTAMINANT EXPOSURE INFORMATION					
Substance CAS No.	**Ionization Potential eV**	**OSHA TWA Exposure Limit**	**OSHA STEL / Ceiling Limits**	**IDLH Level**	**Target Organs**
Acenaphthene CAS No. 83-32-9	N.P	benzene soluble fraction 0.2 mg/m^3 (coal tar pitches)	None Listed	None Listed	None Listed
Benzo (a) pyrene CAS No. 50-32-8 **(Surrogate for all PAHs)**	N.P	benzene soluble fraction 0.2 mg/m^3 (coal tar pitches)	None Listed	None Listed	None Listed
Ethylbenzene CAS No. 100-41-4 **(Surrogate for diesel and heavy oil)**	8.76 eV	100 ppm (435 mg/m^3)	None Listed NIOSH STEL 125 ppm	800 ppm (10% LEL)	Eyes, skin, respiratory system, central nervous system
Naphthalene CAS No. 91-20-3	8.12 eV	10 ppm	None Listed NIOSH 15 ppm	250 ppm	Eyes, skin, central nervous system, blood, liver.
Toluene CAS No. 108-88-3 **(Surrogate for diesel and heavy oil)**	8.82 eV	OSHA 200 ppm 100 ppm* NIOSH REL 100 ppm	OSHA 300 ppm NIOSH STEL 150 ppm	500 ppm	Eyes, skin, respiratory system, central nervous system, liver, kidneys.
o, m, p, Xylenes (o) CAS No. 95-47-6 (m) CAS No. 108-38-3 (p) CAS No. 106-42-3 **(Surrogate for diesel and heavy oil)**	8.44-8.56 eV	100 ppm	150 ppm	900 ppm	Eyes, skin, respiratory system, central nervous system , GI tract, blood, liver, kidneys.

Signature of Project Manager: _____ Date: ___ / ___ / ___

This signature indicates that the above project manager is aware of the potential hazards at this site, and will communicate these hazards, and appropriate controls to Golder staff prior to their deployment on site.

PERSONAL SAFETY EQUIPMENT & TRAINING REQUIREMENT SUMMARY

Personal Protective Equipment (PPE) & Additional Equipment Required

PPP/ Equipment	Required?	Notes:
Hard Hat	Std/D	During Sampling Activities
Eye Protection	Std/D	
Steel Toe Boots	Std/D	
Hearing Protection	☒	Must be worn whenever mechanical equipment is operating.
Hi-Vis Vest	☒	
Face Protection	☐	
TYVEK Suit	☐	
Gloves	☒	Must be worn whenever sample collection is conducted.
Fall Protection	☐	
Life Preserver (PFD)	☒	Must be worn when working along the St. Joe River.
Cold Weather Gear	☐	
Self Rescuer	☐	
Dosimeter(Badge)	☐	
Headlamp	☐	
Boots (other)	☐	
Bear Spray	☐	
Air Quality Monitor	☐	
Fire Extinguisher	☒	Stored in vehicle.
First Aid Supplies	☒	
Whistle/ Air horn	☐	
Washing Facilities	☐	
Drinking Water	☒	
Additional Communication	☐	
Wheel Chocks	☐	
	☐	

Training Requirements

Training Program	Required?	Staff Requiring
Golder Health & Safety Orientation	X	All Golder Field Staff
OSHA 10-hr Construction Safety	X	All Golder Field Staff
First Aid/CPR	X	All Golder Field Staff
OSHA HAZWOPER	☒	
MSHA Part 48 - Surface	☐	
MSHA Part 48 - Underground	☐	
MSHA Part 46 - Surface	☐	
Confined Space Entry	☐	
Respirator Fit Testing	☐	
Industrial First Aid	☐	
Transport. Danger. Goods	☐	
Emergency Procedures	☐	
Boat Safety	☐	
Self Rescuer Use	☐	
Helicopter Safety	☐	
Fall Protection Training	☐	
Rescue Training	☐	
	☐	
	☐	
	☐	
	☐	

CHANGES TO THE FIELD HEALTH & SAFETY PLAN

If the conditions / hazards in the field are significantly different from those anticipated / assessed in the Potential Hazard Assessment, the Project Manager (PM) must be informed immediately. At this point the PM will decide on the appropriate course of action, and give you verbal authorization to enter this information into the **special instructions** section of this HASP. This may include a temporary work stoppage.

Action Levels:

Site workers must notify the site health and safety coordinator immediately in the event of any injury, or if signs or symptoms of overexposure to hazardous substances are exhibited. Specific hazardous substances expected at the site and action levels are identified and listed below.

Monitoring Instrument	Monitoring Frequency	Action Level/Criteria	Specific Action
PID	Continuously during well drilling activities	If the PID reading is 10 ppm (in breathing zone)[1]	Cease work and evacuate area. Upgrade to level C for emergency stabilization/ demobilization purposes only. Evaluate if mechanical ventilation is feasible. Contact PM and HSC for further options.

[1] This should be established on each site based on the contaminants present and should be set at one-half of the lowest published standard. Be careful that the PID will measure the contaminant and compensate for how well the contaminant is measured (see manufacturer data).

In summary, the following is a list of COPCs for the Site:

- Diesel and heavy oil
- Naphthalenes
- PAHs (including carcinogenic PAHs)
- Metals in the Ground Water

☒ Chemical Exposure Information included in this HASP

PROJECT SITE CONTACT FORM
(COPY MUST BE GIVEN TO THE PROJECT MANAGER OR DIRECTOR)

Project Title: Avery Landing Site Engineering Evaluation Project Number: 073-93312-02

Site Name: Potlach Avery Landing

Street Address: The Site is located along State Highway 5 about 0.75 mile west of the town of Avery, Idaho.

Employee Name: [TBD] Res. Phone: [TBD]

Pager Number: [TBD] Cell Phone: [TBD]

Project Manager: [TBD] Res. Phone: [TBD]

Site H&S Contact: [TBD]

Phone No. of H&S Contact: [TBD]

REMOTE SITES CONTACT

Departure Date: [TBD] Expected Return: [TBD]

Lodging: [TBD] Phone No: [TBD]

Emergency Notification Procedures for Key Contact Person

Within 4 hours of missed check-in time:

- Try to contact employee by radio or phone, as appropriate
- Check employee's hotel
- Call client site and request client try to locate employee
- Check with other Golder employees in the area

After a maximum of 4 hours (less time may be appropriate based on weather conditions or other factors) of failed contact:

Notify the following that the employee is "overdue".

- Office Manager
- Search & Rescue
- Client
- Other Golder employees in the area

ON SITE SAFETY BRIEFING TRACKING FORM

Meeting Type- Site Orientation or Tailgate Talk	Meeting Attendee	Initials*	Date	Topics Discussed / Concerns Brought Forward
To be completed during the project.				

***Please ensure that all workers (including other contractors) attending the safety meeting, initial the column beside their name ***

Golder Associates Inc.
1200 W. Ironwood Drive Suite 102
Coeur d'Alene, Idaho 83814
Telephone: (208) 676-9933
Fax: (208) 676-8602
www.golder.com

TECHNICAL MEMORANDUM

TO: Potlatch Forest Holdings Inc. Terry Cundy DSM
FR: Douglas Morell and Donna DeFrancesco, Golder Associates
DATE: June 23, 2009
OUR REF: 073-93312-02.002

RE: BIOLOGICAL ASSESSMENT WORK PLAN FOR AVERY LANDING SITE

1.0 INTRODUCTION

The following information provides a description of the work plan anticipated to be conducted to develop a Biological Assessment (BA) for Potlatch's Avery Landing Site. Final methodologies and Project Actions to be considered in the Biological Assessment will be determined based on the EPA selected removal action from the Engineering Evaluation/Cost Analysis (EE/CA) Report.

Section 7 of the Endangered Species Act (ESA) requires preparation of a BA for any major construction project with a federal nexus. The purpose of a BA is to evaluate whether the potential effects of a proposed project will adversely affect threatened and endangered species occurring in the project area. The BA will also determine if the project will jeopardize the continued existence of candidate species or species proposed for listing under the ESA and if it will adversely affect designated or proposed critical habitats that are likely to occur in the vicinity of the project.

Development of the BA will use the "best available scientific and commercial information" (USFWS, NOAA Fisheries 1994). This information will be used to help analyze project impacts and is the basis for the effect determination. Ultimately, this information will be evaluated by the Services for acceptance.

The BA will provide a description of the proposed action (project), a summary of species biology and distribution, and a description of the environmental baseline for the project including the status and distribution of these species in the project area based on current knowledge and information. The BA will provide an assessment of the potential effects of the project on listed species and a determination about any potential adverse effects based on this information. The BA will be based largely on available information, however, some primary data may be collected from the site through habitat mapping or plant, fish, wildlife surveys depending on the amount of existing information available and the listed species within and surrounding the project area.

2.0 METHODS

The BA report will be prepared following the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) (1998) *Final ESA Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conferences*. The BA will provide a summary of the available information regarding listed, proposed, and candidate species in the area as well as critical habitat and a thorough effects analysis of the proposed project on the species and habitat. A letter

from the USFWS dated January 16, 2008 to the EPA provided a threatened, endangered, proposed and candidate species list for the Avery Landing Site. At the time of that letter, Gray wolf (*Canis lupus*) and Bull trout (*Salvelinus confluentus*) were identified as the listed species in and near the project area. No candidate species were identified. Bull trout critical habitat was also identified in the project area.

Updated species lists will be obtained prior to the preparation of the BA. Species and habitat information sources may include published literature (including internet resources); a search of the Idaho Conservation Data Center Database (CNDB) maintained by the Idaho Department of Fish and Game; data available from the USFWS; and communication and interviews with resource experts and agency personnel. The request area for species information may include all of the 1:24,000 USGS quad boundaries that intersected a two mile buffer of the project area.

Proposed species are those for which the USFWS has formally proposed to list as threatened or endangered. Once proposed, there is typically a status review period (often 12 months) where the USFWS reviews all existing information, data, and threats to the species and makes a listing decision. Species proposed for listing receive protection under the ESA in that proposed projects may not jeopardize the continued existence of these species. The USFWS maintains a list of candidate species for listing as threatened or endangered.

Candidate species are those for which the USFWS has sufficient information on their status and threats to propose them as endangered or threatened, but for which proposed listing is precluded by other higher priority species or actions (USFWS 2000). While candidate species receive no protection under the ESA, the USFWS encourages actions that conserve these species. Critical habitat for threatened or endangered species is defined by the Endangered Species Act as the specific area(s) within the geographical range of a species where physical or biological features are found that are essential to the conservation of the species and which may require special management consideration or protection. Critical habitat is specific geographic area(s) designated by the USFWS for a particular species. Under the ESA, it is unlawful to adversely modify designated critical habitat.

A site review of the project area including habitat types present will be performed prior to the preparation of the BA. Descriptions of the project area and habitat will be based on site visits, examination of aerial photographs and topographic maps, and results of any ecological baseline studies conducted for the project. The nature of any ecological baseline studies (i.e spawning survey, redd counts, fish habitat, etc) will be determined based on the EPA selected removal action.

Descriptions of potential habitat, natural history, and behaviors will be based mainly on published literature and communications with resource experts. The occurrence and status of listed species in and near the project area will be based on the available information, communication with agency personnel, and data collected from the project area. Any additional needs for primary data collection (field studies or field verifications) will be determined based on the amount of existing information available and the Project Actions.

3.0 EFFECTS DETERMINATION

The BA will provide information for all listed species focusing on, but will not be limited to:

- establishing the current status, use, and behavior of the species in the project area
- establishing the current distribution of important habitat in the project area for the species

- determining the direct, indirect, and cumulative effects (as defined by the ESA) on the species within the project area
- determining the likelihood of the project adversely affecting the species
- identifying conservation measures (mitigation) that may be implemented to avoid and minimize adverse impacts to the species
- determining the expected status of the species within the project area after project construction

The BA will include a matrix that lists species, status, habitat, presence of habitat on site, and likelihood of occurrence at Avery Landing site. The BA will evaluate potential effects of the proposed project, including: direct, indirect, and cumulative effects. Potential effects associated with major construction projects on threatened and endangered species include both direct and indirect effects. Direct effects are results of the proposed action and would include effects such as loss of habitat and mortality of individuals. Indirect effects are those caused by the proposed action that are reasonably certain to occur and may include effects such as disturbance and/or displacement of individuals, and change in habitat suitability or habitat degradation. Effects may be temporary (short-term), for example the life of the construction, or long-term, depending on the nature of the project actions. Also, effects may be cumulative, arising from the total impact of development, management, and use of the surrounding land.

Prior to initiation of any construction, the species list will be confirmed and the BA may be revised (or amended) if: (1) the scope of work changes significantly so as to create potential effects to listed species not previously considered; (2) new information or research reveals effects of the proposed project may impact listed species in a manner not considered in this BA; or (3) a new species is listed or critical habitat designated that may be affected by the project.

4.0 REFERENCES

U. S. Fish and Wildlife Service/National Marine Fisheries Service. 1994. Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities, Washington , D. C.

U. S. Fish and Wildlife Service. 2000. The Endangered Species Act and Candidate Species. U. S. Fish and Wildlife Service, Division of Endangered Species, Arlington, Virginia

U.S. Fish and Wildlife Service. January 16, 2008. Letter to EPA concerning Species List for Former Railroad Maintenance and Refueling Facility. Signed Suzanne Ardet. USFWS.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. *Final ESA Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conferences*. U. S. Fish and Wildlife Service, Division of Endangered Species, Arlington, Virginia

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052-3333
Telephone (425) 883-0777
Fax (425) 882-5498
www.golder.com

TECHNICAL MEMORANDUM

TO: Potlatch Land and Lumber, LLC **DATE:** June 23, 2009

FR: Tom Hoffert and Douglas Morell **OUR REF:** 073-93312-02.002

RE: CULTURAL RESOURCES WORK PLAN FOR THE AVERY LANDING SITE, AVERY, IDAHO

A number of steps will be taken to complete the pre-field assessment of the cultural resources that may be affected by the proposed project at the Avery Landing Site in Avery. Idaho. The first step will be to conduct a Class I inventory. Depending on the results of a Class I Inventory, the State Historic Preservation Office (SHPO) of Idaho may require a Class II or Class III Inventory to be conducted.

1.0 CLASS I INVENTORY

A Class I inventory will be initiated and conducted prior to any ground breaking activities. A Class I inventory will consist of an overview of Idaho SHPO files of all previous archaeological inventories and recorded sites located in the area of potential effect (APE) of the proposed project.

The Class I inventory will consist of:

A site file search:
Per the accepted standard within the archaeological discipline, the search will be conducted by an Idaho permitted archaeologist and will encompass all lands within one mile of the Project. The search will indicate whether previous archaeological inventories have occurred within the area of potential effect (APE) and what types of sites may be expected in the region. The number, type and significance of any sites recorded during previous inventories within the APE will also be shown. Any cultural resources evaluation or inventories conducted by the U.S. Environmental Protection Agency (EPA) or their consultants for investigation activities will be obtained from SHPO during the Class I Inventory.

Obtaining/reviewing previous documentation and records:
If sites are present within the requested search parameters, the site forms will be obtained from the Idaho SHPO, which is charged with maintaining the permanent records for Idaho. Past project reports will also be acquired. Historic maps will also be reviewed in order to determine the presence of significant historic features such as homesteads or transportation routes. A nominal fee is required by the SHPO for these services.

Tribal consultation:
The Project area is within the traditional territory of the Coeur d'Alene Tribe and as such the Tribe will be consulted regarding their knowledge of any past traditional land use in the area or to

determine if the Tribe has any concerns with the proposed undertaking at the Site. A representative of the Tribe will also be afforded the opportunity to partake in the Class III inventory, if indeed a Class III inventory is required by Idaho SHPO.

2.0 CLASS II OR CLASS III INVENTORY:

Depending upon the results of the Class I inventory, the Idaho SHPO will then decide whether or not the APE requires a subsequent Class II or Class III inventory. The SHPO may also decide that no additional work is required. If the pre-field Class I inventory shows that all or portions of the APE have been subject to previous archaeological inventory, and that no significant sites or features are in conflict with the proposed development, then no further work is expected to be required in the for the Avery Landing Site.

A Class II inventory is usually used only as a methodology in large scale projects for locating areas with good or better cultural resources potential which would then require investigation at the Class III level.

A Class III inventory is a systematic, detailed field inspection done by a professional historian, architectural historian, archaeologist, and/or other appropriate specialists. This type of inventory is usually required to formulate a preliminary determination of the significance of resources and their eligibility for listing in the National Register of Historic Places (NRHP). It is preceded by an adequate literature search (Class I), and, sometimes, by a reconnaissance effort (Class II).

If it is required that a Class III inventory be conducted in order to meet the requirements of Section 106 of the National Historic Preservation Act 36 CFR Part 800 (as amended), a permit will be obtained from the Idaho SHPO prior to any work being conducted.

The Class III inventory will consist of a two person crew of archaeologists conducting transects spaced no more than 30 meters apart across the entire surface soils of the Site. All artifacts and features whether historic or prehistoric will be recorded and their location documented using a hand held Global Positioning System (GPS) unit.

3.0 REPORTING

Once work is completed a report documenting the results of the Class I and Class III (if required) Inventory along with any relevant background research will be incorporated into a report. The report will then be submitted for concurrence by the Idaho SHPO.